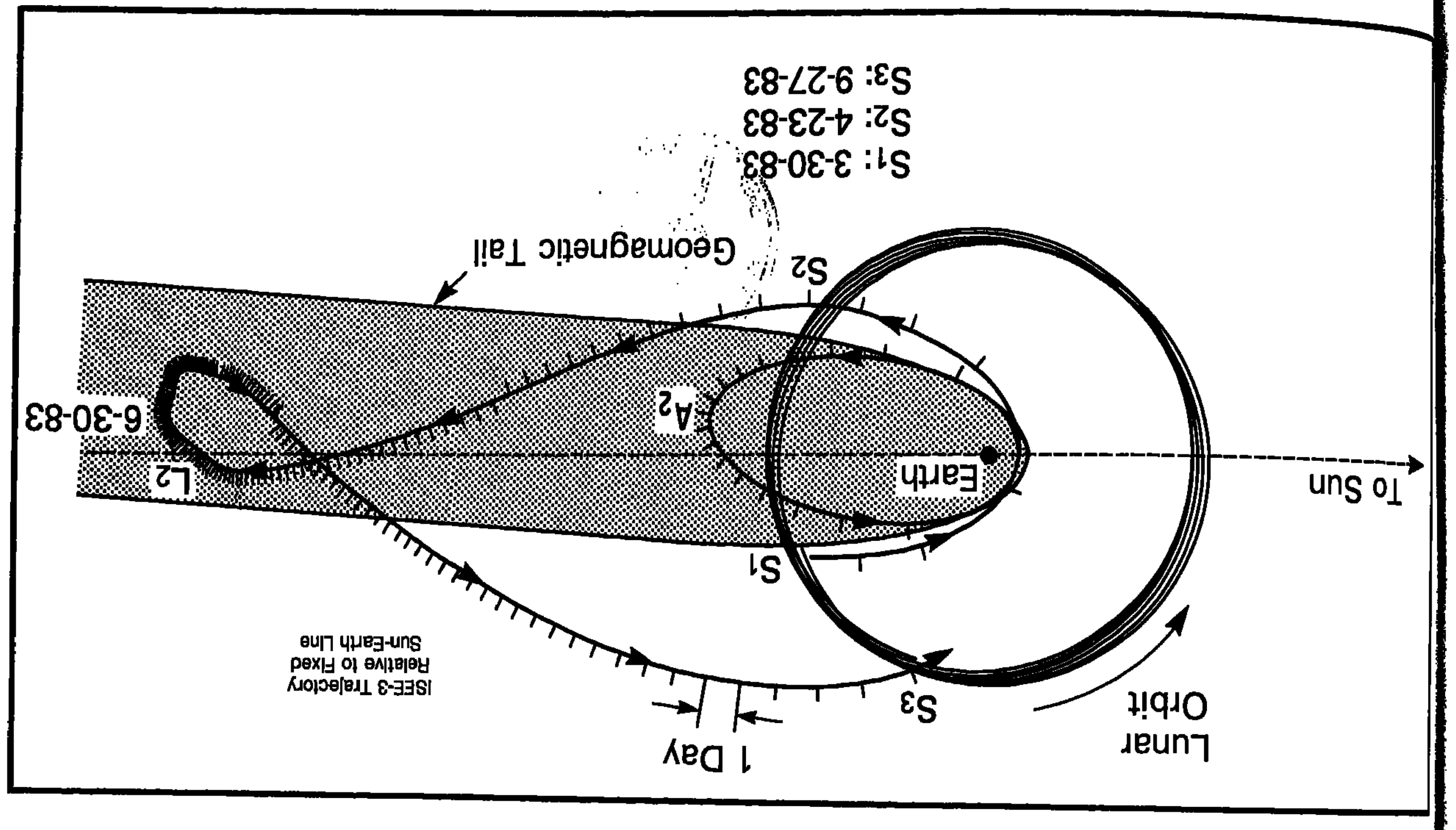

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News

New Hot Vents in NE Pacific

Over the past few years many workers have been attracted to the Juan de Fuca ridge 500 km off the Pacific northwest coast to study its tectonics. Investigations by both American earth scientists in the southern part of the system and Canadians where the northern extension enters territorial waters provided much of the background for the first submersible venture on this actively spreading ridge. In August 1983 a joint expedition of Canadian and American geologists and biologists set out to examine the ridge in the area of a seamount that sits astride the spreading axis. Scientific participants came from the universities of British Columbia, Victoria, Washington, Toronto, California at Santa Barbara, and the Institute of Ocean Sciences, British Columbia.

The three-person submersible *Pisces IV* is owned by the Department of Fisheries and Oceans (Canada) and is operated by the Institute of Ocean Sciences, Sidney, B.C. This cruise represented her first venture below 800 m; she performed eight dives and averaged 9 hours a dive.

The seamount caldera, about 12 km², is floored with young, glassy lavas that are pitted with collapse features. The caldera walls, on the other hand, are older and cut by a suite of fissures. Hydrothermal activity was discovered in the continuation of one fissure on the caldera floor at 1580 m and close to the targeted junction of the northern caldera wall and the spreading axis. The fissure, 300 m long and barely wide enough to allow the submersible entry, contained a series of warm-water vents with water to 35°C. The biota here was prolific but no sulphide deposits were evident. Outside the fissure, however, two isolated chimneys were found, from one of which warm water still issued. The structures were about 9 m high and 4 m wide at the base. A 150-kg sample revealed a porous mass of sulphates, iron and zinc sulphides, and remains of beardworms (pogonophorans).

Animal growth on the glassy surfaces in the caldera was sparse. Approach to the vents was indicated by increasing numbers of crabs and occasional bacterial mats. The fissure itself was carpeted by mats in which polychaetes and gastropods could be seen. In areas of active venting, the exit of water was obscured by extensive growths of beardworms that formed large structures in which many other vent-specific species were found (see cover). In addition to numerous rock samples, the sub also collected thousands of animal specimens and drew samples of the vent water.

Plans for future work on this spreading system are being made for next year. The *Alvin* will spend much of the summer on the ridge while *Pisces* will return to the axial seamount; a proposal is also being reviewed to bring the French submersible *Cyana* to the area at the same time. The Juan de Fuca may need some traffic beacons, both on the surface and on the floor, for some time to come.

This news item was contributed by Verena Tunnicliffe, *who is with the University of Victoria, Victoria, B.C., Canada V8W 2Y2.*

Editorial

On Being President of AGU

Editor's Note: The following statement was made by President James A. Van Allen to the AGU Council at its meeting on May 31, 1983. The next meeting of the Council will be on December 6, 1983, in San Francisco.

I am now finishing the first year of my 2-year term as President of the Union, having served 2 years previously as an apprentice under Tuzo Wilson's wise leadership. Among the many things that I learned from Tuzo was to refer all thorny matters to appropriate committees.

I wish to report that presiding over the professional activities of some 16,000 colleagues is simultaneously bewildering and inspiring.

The bewilderment arises from the difficulty of maintaining even a zero-order comprehension of what is going on in the great diversity of fields within our Union, though I believe that I can discern a commonality of motivation and an increasing level of overlap and mutual interdependence.

The inspiration comes from scanning our journals, abstracts of meetings, and other publications and realizing the immense research productivity of our members. It also comes from a reasonably first-hand knowledge of the devoted and highly competent service to the geophysics profession by our great network of editors, headquarters staff, and Union and Section officers; and by the many committees that provide substantive guidance to the Union's activities. I have found it to be uncommon for any member to decline service on a committee.

During the past year we established two new, ad hoc committees in response to a significant level of membership interest. The first of these, the Committee on the History of Geophysics, under David Stern's chairmanship, is already quite active and productive. The second, the Committee on Mineral Physics, under Orson Anderson's chairmanship, is just getting underway.

We have also created one new-all Union award during the past year, the Waldo E. Smith Award, for outstanding service to geophysics.

I look forward to my second year of serving you as President of AGU.

Kinetic Factors in Geothermometry

The application of geothermometer/geobarometer mineral assemblages as markers of temperature and pressure in geologic formations has become highly sophisticated by the inclusion of kinetic factors in analytic procedures. That a chemically complex mineral assemblage has equilibrated during its geologic history under intense conditions is a major premise in geothermometry. That the equilibrium conditions have been quenched into the phases so that composition and crystal structure may be used to reveal the temperature-pressure-fugacity that characterized a point—the most intense point—in an assemblage's geological history is another premise. Rarely does either premise prove entirely true, but kinetic factors, if understood, could assist in their interpretation.

Recently A. C. Lasaga developed an analysis he dubbed "geospeedometry" as an extension of conventional geothermometric analysis (*Kinetics and Equilibrium in Mineral Reactions*, S. K. Saxena (Ed.), Springer-Verlag, New York, pp. 81–114, 1983). Lasaga treated analyses of several ion-exchange mineral pair geothermometers to include diffusion coefficients, time factors, and thermal evolution. The result was a set of working equations to calculate the kinetic response of ion exchange geothermometers to their thermal history.

The approach of geospeedometry is valuable in evaluating the rate-determining steps of mineral reactions. The ultimate value of a geothermometer is not necessarily evident in a lack of chemical zoning, as had been thought in many instances. It is largely the mineral phase with the slowest diffusion process in the temperature range of interest that identifies a useful mineral assemblage. Lasaga found, for instance, that the usefulness of olivine crystals as geothermometers is narrowly limited to relatively fast cooling rates (greater than 10°C per year). By contrast, the suitability of garnet geothermometers in Lasaga's words is "quantitatively proven." One must be cautious, however, in interpreting upper-mantle temperature-pressure conditions from studies of garnet-pyroxene pairs; in some examples, lack of equilibrium is a source of error.—*PMB*

Chesapeake Bay Under Stress

According to extensive data obtained over its 13,000 km of shoreline, the Chesapeake Bay has been suffering a major, indeed unprecedented, reduction in submerged vegetation. Chesapeake Bay is alone in experiencing decline in submerged vegetation. Other estuary systems on the east coast of the United States are not so affected. These alarming results were obtained by the synthesis of the findings of numerous individual groups in addition to large consortium projects on the Chesapeake done over the past decade. R. J. Orth and R. A. Moore of the Virginia Institute of Marine Science pointed to the problem of the severe decline of submerged grasses on the Bay and along its tributaries. In a recent report, Orth and Moore note: "The decline, which began in the 1960's and accelerated in the 1970's, has affected all species in all areas. Many major river systems are now totally devoid of any rooted vegetation" (*Science, 222,* 51–53, 1983).

The precipitous decline in the many different varieties of submerged aquatic vegetation has serious implications for the Chesapeake Bay. Important brackish/saltwater marine life and water fowl use the so-called salt grasses and cannot exist without them. Moreover, the grasses play an important function in stabilizing the sedimentary formations that underlie the Bay. Without this stabilization, the fragile shorelines are subject to rapid destruction. The 290-km long Chesapeake Bay is the world's largest estuary. It could become characterized by highly sedimented shallows within decades instead of following a gradual change thought to require geologic processes over a period of several thousand years.

Analysis of seeds and pollen stored in Bay sediments in some areas has revealed a continuity in the existence of Bay grasses for more than 200 years. Suddenly, in 1972, they disappeared from the stratigraphic record. In the ensuing 10 years there has been no sign of new vegetation. This decline extends to all species, and is thus not localized.

The causes for the decline of Bay grasses are not so simple to deduce. In the simplest analogy it would appear that the loss of grasses has resulted from decreasing light penetration of Bay water because of the increased growth of phytoplankton and because of fine sediment dispersal. Nutrient enrichment is a probable cause. The concentrations of phosphorous, nitrogen, and chlorophyll have been increasing for several decades in direct or indirect response to the increased transport of fertilizers into the Bay. Likewise, pesticides could affect the plant life.

In upper Chesapeake Bay regions, the decline of the critical submerged grasses began in the 1960's. However, the 1972 date, which applies to the lower Bay, coincides with the date of Tropical Storm Agnes. Large volumes of fresh water and sediment flowed into the Bay after Agnes. Salinities were reduced in all parts of the Bay for several weeks, affecting much of the brackish water marine life. Major changes in the existing submerged grasses of the Bay occurred. The decline has not stopped. It would be important to study the silting and sediment record in detail. Likewise, it will be important to preserve all areas of existing submerged grasses.—*PMB*

Counting Clouds

A 5-year, international scientific program is under way to study and describe in detail the earth's cloud cover. In the hope that it will contribute to our understanding of how clouds affect, and are affected by, weather and climate, the United States, Canada, Japan, India, and several nations of the European community are participating in the International Satellite Cloud Climatology Project. The project will use data from an array of earth-orbiting satellites to inventory the whirling clouds below.

The ultimate aim of the study is to improve worldwide weather forecasting. Clouds can have either a cooling or warming effect—cooling when they reflect incoming solar radiation back into space, and warming when they trap heat reflected from the earth's surface. The net effect is still a matter for study, however, as are the questions of whether a global climatic warming would increase or decrease cloud cover, or whether clouds stabilize or destabilize the climate.

The project will use data and images from five geostationary meteorological satellites: the European Space Agency's Meteosat, India's Insat, Japan's GMS (Geostationary Meteorological Satellite), and two U.S. Geostationary Operational Environmental Satellites, GOES-East and GOES-West. Also contributing data will be the U.S. TIROS-N polar-orbiting satellite. All six satellites are expected to be operational by the end of 1983.

The lead U.S. agencies for the project are the National Oceanic and Atmospheric Administration and the National Aeronautics and Space Administration (NASA), and Robert Schiffer of NASA is the international project manager. The National Science Foundation and the departments of Energy and Defense are also participating in the project, which is being conducted under the aegis of the World Climate Research Program, sponsored jointly by the World Meteorological Organization and the International Council of Scientific Unions.

Offshore Oil Prospects Improve

The issues, prospects, and environmental concerns about drilling for offshore oil and gas are being seen in a different light than at any other time during the past decade. Exploration drilling on offshore locations is proceeding at a high rate, and environmental concerns, while recognized as real, appear to be a lot less worrisome than might have been predicted a decade ago. Part of the reason for the changes in levels of concern results from the close monitoring programs that have been in effect for the past few years. Paul R. Ryan of the Woods Hole Oceanographic Institution recently described exploration activities on Georges Bank: "We now have the results of the first year of monitoring, and, although eight wells are considered a minimal observational test, there were no biological changes in the benthic community that could be attributed to drilling activity." (*Oceanus, 26,* 2, 1983). The U.S. Geological Survey studied the Georges Bank drilling activities as well. Barium from drilling muds was detected at the sites, but in decreasing concentrations at distances away from drilling rigs. There was no evidence that the discharges caused biological changes. According to Ryan: "Postdrilling concentrates of barium were found to be within the range of predrilling concentrations measured at other locations on the Bank. Concentrations of other metals measured were low and characteristic of unpolluted, coarse-grained sediment in other Continental Shelf areas."

A factor in present-day offshore oil and gas exploratory drilling is the experience gained from the Deep Sea Drilling Project. The drilling ship *Glomar Challenger* has penetrated the ocean floor of the Mariana Trench at water depths of approximately 7 km, setting an example whose model has been influential on exploration. Oil rigs must use riser systems to avoid the release of drilling muds and cuttings, and they generally must penetrate to greater depths in sediment than the *Glomar Challenger*. Nonetheless, offshore oil rigs are drilling in water depths of approximately 3 km, and then continuing into sediment for a kilometer or more. Because only a few percent of drillable offshore areas have been explored, the pace of this type of drilling will not lessen in the next decades. Undiscovered petroleum resources on continents and their shelves and ocean slopes are estimated at more than 3×10^{12} barrels (573×10^{12} liters) worldwide.

In reference to the Law of the Sea, Hollis D. Hedberg recently stated:

"The Law of the Sea Treaty, as presently proposed, fails to provide a sound and definite basis for drawing the limit between coastal-state and international jurisdiction over mineral resources along the outer edge of the continental margin where it extends more than 200 nautical miles from shore. In effect, this uncertainty means that exploration will be deterred over large areas of the continental margin. There are two formulas for determining boundaries allowed by the Law: the first is based on the impracticable measure of the thickness of sediments as a function of distance from the foot of the slope; the second involves the difficulty of drawing directly a precise base-of-slope boundary, with no provision for a guiding, internationally approved boundary zone within which each coastal state could establish its own precise boundary.

"No oil company is going to risk the huge amount of money required for a well in these very deep waters without clear demarcation of a national boundary. Hence, the region affected by the dubious boundary—which may be many thousands of square miles in area and commercially significant—becomes valuable to no one." (*Oceanus, 26,* 2, 1983).

Even under the constraints imposed by the Law of the Sea and by natural barriers of deep ocean sites, drilling is proceeding and the prospects of finding major fields are good. The potential problems of assessing the discharges from the drilling process continue to be addressed. R. P. Trorine and J. H. Trefry of the Florida Institute of Technology recently described new techniques to trace the distribution of such discharges in a study conducted on the outer continental shelf of the northwest Gulf of Mexico (*Environmental Science and Technology, 17,* 507–512, 1983). As new drilling techniques with highly developed risers and discharge control methods are developed, new tests can assess their effectiveness in offshore operations.—*PMB*

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Replies to ads with box numbers should be addressed to Box ___, American Geophysical Union, 2000 Florida Avenue, N.W., Washington, D. C. 20009.

For further information, call toll free 800-424-2488 or, in the Washington, D. C., area, 462-6903.

POSITIONS AVAILABLE

Senior Research Geophysicist/Continental Shelf Institute (IKU), Trondheim, Norway. A position is available to head and develop our section for applied research within seismic data acquisition, processing and interpretation. The section should consist of 6–7 professionals, of which 3 geophysicists are already employed. In cooperation with Geco and Norske Shell, IKU operates a fully equipped processing center (NORSEIS system) located at IKU's premises. The position will involve responsibility for generation, presentation and accomplishment of R & D projects within the above mentioned fields. This will include a broad communication with the oil companies engaged on the Norwegian continental shelf as well as other R & D institutions.

The candidate should have an advanced degree in geophysics (or related disciplines) and at least 5 years experience with seismic research and/or exploration.

We can offer competitive wages (taxfree the first two years), Governmental Pensionscheme, collective insurance.

For application and further information, please write to Hans Olav Torsen, IKU, Box 1883, 7001 Trondheim, NORWAY, as soon as possible.

Louisiana State University/Chas. T. McCord, Jr. Endowed Professorship in Hydrocarbon Exploration: The Geology Department is seeking an internationally recognized leader in some research specialty critical to the search for oil and gas to fill the Chas. T. McCord, Jr. Endowed Professorship. Applicants are expected to maintain scholarly research in their area of specialty. Rank at Full Professor level with salary competitive with endowed professorships at other major research universities. For consideration send resume, three letters of reference, and a description of future research programs to Lyle McGinnis, Faculty Search, Department of Geology, Louisiana State University, Baton Rouge, LA 70803–4101. Search will remain open until position is filled.

LOUISIANA STATE UNIVERSITY IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER.

The College of William and Mary/Physics Faculty Position. William and Mary expects to have a tenure-track opening at the assistant-professor level for August, 1984. Preference will be given to applicants in the fields of theoretical plasma physics (including computer simulation), nonlinear mechanics, or statistical mechanics. The physics department currently consists of 22 faculty, 7 postdoctoral research associates, and 40 Ph.D. candidate graduate students. Plasma physics funding is currently from NASA and the Department of Energy. Please send vitae and list of three references to: Chairman, Search Committee, Physics Department, College of William and Mary, Williamsburg, Virginia 23185.

William and Mary is an affirmative-action, equal-opportunity employer; women and minority applicants are encouraged to apply.

University of Texas at Austin/Getty Chair. The Department of Geological Sciences seeks a person at the rank of full professor to occupy the recently endowed Getty Chair effective September 1, 1984. Teaching obligations include one undergraduate or graduate course each semester and the supervision of graduate students in the areas of the person's interest. A willingness to teach courses for non-majors on occasion is desirable. The person's field of research must be one that is related in a broad sense to the exploration for hydrocarbons. The Getty endowment will provide the chair holder with modest funds for support of travel and research activities. Applicants should submit a detailed resume, names and addresses of five references, and a statement of teaching and research interests by February 1, 1984 to: Dr. Earle F. McBride, Chairman, Department of Geological Sciences, P.O. Box 7909, Austin, Texas 78712–7909.

The University of Texas at Austin is an Equal Opportunity/Affirmative Action Employer.

Ohio State University/Structural Geologist. The Department of Geology and Mineralogy, The Ohio State University, invites applications for a tenure-track position for a structural geologist with a strong background in quantitative analysis of field data and research interests in regional tectonics or tectonophysics. The successful applicant will be expected to participate in the undergraduate program and give graduate courses in his/her field of expertise, conduct research, supervise graduate students, and interact with other departmental programs in regional geology and geophysics. Preference will be given to candidates with post-doctoral or industrial experience. Rank and salary commensurate with experience and research record. Please send applications or nominations as soon as possible to:

Dr. Ralph R.B. von Frese
Chairman, Search Committee
Department of Geology and Mineralogy
The Ohio State University
Columbus, OH 43210
Phone: (614) 422-5635 or 422-2721

Applications should include a resume, a statement of research interests and the names of at least three persons whom we may contact for recommendations. The closing date for applications is December 23, 1983; appointments will be effective no later than October 1, 1984. Additional information can be obtained by writing or calling the search committee chairman.

The Ohio State University is an equal opportunity/affirmative action employer.

OCEANOGRAPHER

RESEARCH AND DEVELOPMENT CENTER · UNITED STATES COAST GUARD

The U.S. Coast Guard Research and Development Center, Groton, CT, has an immediate opening for an Oceanographer (GS-1360-11). The incumbent serves as task manager providing theoretical and computational assistance for the development of specified surface drift computer models. Translates concepts for the physical interaction of surface movement into operating time-dependent predictive computer programs.

Candidates should be degreed and possess at least 3 years of professional experience in Physical Oceanography. Additional attributes would include competence in computer science, experience in writing technical reports, experience in programming minicomputers in FORTRAN and BASIC, knowledge of statistical practices and analysis techniques as well as excellent oral communication skills. Field work involving stays of a month or more at any location in the continental US including Alaska and Hawaii, is required.

This is a Federal Civil Service position. Applicants must submit OPM form 1282 (Application for Federal Employment). Apply to Office of Personnel Management, Boston Area Office, 3 Center Plaza, Boston, MA 02108. Applications must be received by December 16, 1983. Application forms and information may be obtained by telephoning (203) 444-8202.

UNITED STATES COAST GUARD

Equal Opportunity/Affirmative Action Employer

Chair/Northern Illinois University/Chair. Applications are invited for the position of Chair of the Department of Geology. We seek candidates who have an established commitment to research and who are interested in the challenge of leading a young and growing department which has just recently established a Ph.D. program. The department is committed to the further development of a strong Ph.D. program and is looking for candidates who would share that commitment. We seek the strongest possible candidates without regard to specialty; however, candidates from the areas of hydrogeology, hydrogeochemistry or geophysics are particularly encouraged to apply.

Rank and salary for the position are negotiable. Send resume and statement of interest to Dr. M.P. Weiss, Chair, Search Committee, Department of Geology, Northern Illinois University, DeKalb, IL 60115.

Northern Illinois University is an affirmative action/equal opportunity employer.

Geophysicist, Tectonophysicist/Georgia Tech. The School of Geophysical Sciences at Georgia Tech invites applications for a faculty appointment in Earth Sciences. Applicants must have an outstanding research potential demonstrated by several years of postdoctoral experience or a well-established research record, and experience in securing research funding. Although no field of specialization is excluded, preference will be given to candidates with a background in geophysics/tectonophysics.

The School of Geophysical Sciences has an expanding and active research program in many areas of Earth and Atmospheric Sciences. The School has 23 full-time faculty members and over 50 graduate students.

Applications including resumes, phone numbers, and the names and addresses of at least three references should be submitted to Jean-Claude Mareschal, Chairman, Geophysics Search Committee, School of Geophysical Sciences, Georgia Institute of Technology, Atlanta, GA 30332.

The Georgia Institute of Technology is a unit of the university system of the State of Georgia.

Georgia Tech is an affirmative action/equal opportunity employer.

Oceanographic Microbiologist/Oregon State University. The College of Oceanography at Oregon State University has an assistant professorship position open for an oceanographic microbiologist. The appointee will be expected to develop a program of grant-funded research in the area of marine microbiology. Opportunities will be available for teaching of classes and seminars in marine microbiology and biological oceanography and for supervision of graduate students. Candidates should hold a Ph.D. in biological oceanography, microbiology, or related discipline, and have postdoctoral research experience specifically with marine microbes. Salary: $27,000-$35,000, negotiable. Submit resume and names of three references before 15 January 1984 to: Dr. G. Ross Heath, Dean, College of Oceanography, Oregon State University, Corvallis, Oregon 97331.

Affirmative Action/Equal Opportunity employer.

U.S. Naval Academy/Visiting Professorship. METEOROLOGY August 16, 1984 to June 15, 1985. Some variation of these dates is possible. Excellent opportunity for individual who desires to do research while teaching a very light load in the field of his expertise. The U. S. Naval Academy, located in historic Annapolis on the shore of beautiful Chesapeake Bay, is near Washington, D.C. and Baltimore, MD. Salary commensurate with applicant's background. Considerable latitude of action exists in travel, publishing, etc. Within limitations funding for travel is available. Earned Ph.D. required. Please send Resume and list of publications together with the names and addresses of three references to: Prof. John F. Hoffman, Chairman, Faculty Search Committee, Oceanography Department, U. S. Naval Academy, Annapolis, MD 21402. Closing date: January 31, 1984.

An Equal Opportunity/Affirmative Action Employer.

University of Toronto/Faculty Position in Metamorphic Petrology. Department of Geology has a 3-year academic appointment available effective 1 July 1984. The successful applicant will teach undergraduate and graduate courses in metamorphic and igneous petrology and maintain a vigorous research program. Research fields are open but preference may be given to candidates with expertise in metamorphic petrology. The department has well equipped laboratories including high-quality experimental and analytical facilities. The successful applicant will have a sufficient knowledge of NAA, XRF, or electron probe to help supervise one or more of them. Ph.D. is required (or about to be granted). Post-doctoral research experience would be an asset. Appointment will be at Lecturer or Assistant Professor level. Salary commensurate with qualifications and experience at these starting levels: Lecturer $21,200, Assistant Professor $25,400.

Enquiries including a resume and names and addresses of 3 referees should be addressed to Prof. G. Norris, Chairman, Department of Geology, University of Toronto, Toronto, Ontario M5S 1A1. Closing date for applications is 31 January 1984.

In accordance with Canadian immigration we are required to direct this advertisement initially to Canadian citizens and permanent residents after which other applicants may be considered.

Trinity University/Igneous or Metamorphic Petrologist. The Department of Geology at Trinity University is seeking candidates to fill a tenure track position with a specialty in igneous or metamorphic petrology beginning August, 1984. The appointment will be at the Assistant Professor level and the candidate must possess the Ph.D. degree. Priority will be given to those individuals with expertise in optical mineralogy and petrography. This position requires a person with a commitment to excellence in teaching as well as a desire to engage in an ongoing research program. Teaching will be at the undergraduate level and will include courses in physical geology, petrology, and optical mineralogy.

Trinity University is an independent privately supported institution committed to excellence in the liberal arts and selected professional programs including engineering. Present enrollment is 3,000, of which 2,450 are undergraduates. The Department of Geology has five faculty members and fifty majors. Trinity is located in San Antonio, Texas, a metropolitan area of approximately one million.

Closing date is January 15, 1984. Applications should include a resume, recent transcripts and the names of three references, and should be sent to: Robert L. Freed, Search Committee Chairman, Department of Geology, Trinity University, 715 Stadium Drive, San Antonio, Texas 78284.

Trinity University is an Equal Opportunity/Affirmative Action Employer.

Oregon State University/Fisheries Oceanography. Applications are invited for a 12-month, tenure-track position as Assistant Professor in the College of Oceanography with a joint appointment in the Department of Fisheries and Wildlife. Applicant must have demonstrated ability to conduct independent research and obtain research funding in the areas of ecology of marine fishes or nekton. Workers with interests in ecology, fisheries oceanography, or population biology of nekton will be considered. Applicant must have Ph.D. Postdoctoral experience desirable.

The appointee will be expected to teach courses in fisheries oceanography or in the ecology of marine nekton, to supervise graduate students, and to develop a program of grant-funded research. Salary: $27,000–35,000, negotiable. Application material, including a brief statement of research plans and the names of three references, should be submitted not later than 31 January 1984 to: G. Ross Heath, Dean, College of Oceanography, Oregon State University, Corvallis, Oregon 97331.

Affirmative Action/Equal Opportunity employer.

Physical Oceanographer/Oregon State University. Assistant or Associate Professor, depending on experience. Applicants may be observationalists or theoreticians but must have a Ph.D. in the physical sciences, have demonstrated the ability to conduct independent high-quality research and are expected to obtain research funding. Duties include teaching and supervision of graduate students. Interested candidates should submit a resume and names of three references by 1 February 1984 to: G. Ross Heath, Dean, *College of Oceanography*, Oregon State University, Corvallis, OR 97331.

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Meteorologist/The City College of The City University of New York. The Department of Earth and Planetary Sciences invites applications for an anticipated opening in meteorology. The appointment will start September, 1984. Applicants should have completed the Ph.D. by the time of appointment and have a strong background in synoptic meteorology and computer applications. In addition, the individual should have an interest in atmospheric chemistry or pollution as applied to urban areas or physical oceanography. The person hired will be required to teach courses in meteorology, and possibly physical oceanography as well as develop and maintain an active research program. Participation in the C.U.N.Y. Ph.D. Program in Earth and Environmental Sciences is anticipated. Rank and salary will be commensurate with experience. Send resume, transcripts and three letters of reference by November 30, 1983 to Professor Dennis Weiss, Chairman, Department of Earth and Planetary Sciences, the City College, 138 Street and Convent Avenue, New York, N.Y. 10031.

The City College of the City University of New York is an equal opportunity affirmative action employer.

Virginia Polytechnic Institute and State University/Petrologist. The Department of Geological Sciences at Virginia Tech invites applications for a tenure-track junior level faculty appointment in Igneous or Metamorphic Petrology. Applicants must demonstrate a strong research record in quantitative petrology; preference will be given to those with experience in the theoretical and experimental aspects of petrology. All faculty members at Virginia Tech are expected to provide quality teaching at the undergraduate and graduate levels, supervise M.S. and Ph.D. theses, and conduct an active program of research and publication.

Applicants should send a letter of application, academic vitae and names and addresses of three references to:

D. A. Hewitt
Department of Geological Sciences
Virginia Tech
Blacksburg, VA 24061

The appointment will begin in September 1984 and candidates are expected to have completed requirements for the Ph.D. by that time. The deadline for receipt of applications is December 15, 1983.

Virginia Tech is an equal opportunity/affirmative action employer.

Postdoctoral Research Position/University of California, Berkeley. A postdoctoral research position in petrophysics is available immediately in the Department of Mechanical Engineering. The Department has recently installed in the Petroleum Engineering Laboratory a nuclear magnetic resonance facility, having a large magnet gap. The successful candidate must be knowledgeable and experienced in NMR techniques, and will be expected to employ this and other petrophysics research techniques in an interdisciplinary approach to a program directed at the petrophysics of porous sedimentary rocks and the physical properties of permafrost. Resources of other University Departments and of the Lawrence Berkeley Laboratory will also be available to the research program.

Send resume and the names of three references to Professor W.H. Somerton, Department of Mechanical Engineering, University of California, Berkeley CA 94720.

The University is an Equal Opportunity/Affirmative Action Employer.

Ohio State University/Paleobiologist. The Department of Geology and Mineralogy, The Ohio State University, invites applications for a tenure-track position for a paleobiologist with a strong quantitative background; research capabilities in a major group of invertebrate macrofossils; and the capacity to develop or expand a research program in biogeography, evolutionary paleobiology, functional morphology, or paleoecology that will complement existing programs in biostratigraphy, micropaleontology and sedimentary petrology.

Ph.D. or equivalent is required by the time of appointment. The successful applicant will be expected to teach graduate and undergraduate courses appropriate to their expertise, conduct research and supervise graduate students. Rank and salary commensurate with experience and research record. Please send applications or nominations as soon as possible to:

Dr. Walter C. Sweet
Chairman, Search Committee
Department of Geology and Mineralogy
The Ohio State University
Columbus, OH 43210
Phone: (614)422-2326 or 422-6746

Applications should include a resume, a statement of research record and interests and the names of at least three persons whom we may contact for recommendations. The closing date for applications is December 23, 1983; appointments will be effective no later than October 1, 1984. Additional information can be obtained by writing or calling the search committee chairman.

The Ohio State University is an equal opportunity/affirmative action employer.

Geotechnical Scientists/U.S. Nuclear Regulatory Commission (NRC). Division of Waste Management, NRC, Silver Spring, Maryland invites applications for staff positions in Geology, Geophysics, Geochemistry, Hydrology, Seismology, Rock Mechanics, and Materials Engineering/Science. Successful applicants will serve as technical specialists in the assessment of safety and environmental aspects of site characterization and design of underground geologic repositories for high level waste, low level waste facilities, and uranium recovery operations. Applicants must have knowledge of the principles, theories, and practices in one of the above fields, and good writing and speaking skills. Prefer, as a minimum, Master's Degree in Engineering or Geoscience. U.S. citizenship is required. Salary is commensurate with qualifications. Contact NRC representative at employment area, AGU Fall Meeting, San Francisco, or send resume and Standard Form 171(Personal Qualifications Statement) to: U.S. Nuclear Regulatory Commission, Division of Personnel, PREP Branch: WM, Washington, DC, 20555. U.S. NRC is an Equal Opportunity Employer.

National Center for Atmospheric Research/Ph.D. Researcher. NCAR's Atmospheric Chemistry and Aeronomy Division seeks experienced Ph.D. researcher with record of sustained productivity in theory and modeling of atmospheric chemistry. Primary interest is in gaseous photochemistry and coupled chemical/meteorological models, but all specialties will be considered along with scientific breadth. Appointment is at Scientist III or Senior Scientist level. Apply with resume to Dr. R. Cicerone, National Center for Atmospheric Research, P.O. Box 3000, Boulder, Colorado 80307, by December 20, 1983.

Equal Opportunity Employer M/F.

EOS

Transactions, American Geophysical Union

The Weekly Newspaper of Geophysics

For speediest treatment of contributions send three copies of the double-spaced manuscript to one of the editors named below and one copy to AGU.

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Cover. Prolific beardworm (pogonophorans) growth on sulfide chimneys of the Juan de Fuca spreading zone in the northeast Pacific at 1580 m. See news item this issue. (Photo by John Delaney, courtesy of Verena Tunnicliffe, University of Victoria, Victoria, B.C., Canada.)

University of California, Riverside/Geology (with emphasis on petrology). Assistant Professor opening beginning 1 July 1984. The appointment is ladder faculty position. Appointee would teach at both undergraduate and graduate levels (M.S. and Ph.D.) in Mineralogy, Geochemistry, Crystallography, Petrology, Physical Geology, Field Geology. Ph.D. required. In addition to teaching, research and service are required of faculty members at the University of California. Applicants should submit a current curriculum vitae with names and addresses of three people who have agreed to provide references. Applications received by February 1, 1984, will receive preference. Applications may be accepted until successful candidate is appointed. Send applications to Dr. Lewis H. Cohen, Search Committee Chair, Department of Earth Sciences, University of California, Riverside, California, 92521.

The University of California is an Equal Opportunity/Affirmative Action Employer.

University of California, San Diego/Assistant Research Chemist. The Institute of Marine Resources at the Scripps Institution of Oceanography, University of California San Diego, anticipates an opening for an ASSISTANT RESEARCH CHEMIST (salary range: $22,900-$26,800) in the Food Chain Research Group. The primary responsibility of the position is to carry out fundamental research in marine organic chemistry in association with other IMR oceanographers.

Applicants must have (i) a Ph.D. in organic chemistry, marine chemistry or chemical oceanography and at least two years of post-doctoral experience in marine chemistry; (ii) an ability to carry out independent research in the ocean as demonstrated by an active publication record in refereed journals; and (iii) experience in work at sea with modern sampling and analytical methods.

Send resume and names of three referees by March 1, 1984, to:

Dr. Fred N. Spiess, Director
Institute of Marine Resources, A-028
Scripps Institution of Oceanography
University of California San Diego
La Jolla, California 92093

The University of California San Diego is an equal opportunity/affirmative action employer.

University of Iowa/Faculty Positions. The Department of Physics and Astronomy anticipates two openings for tenure-track assistant professors or visiting faculty to start no later than August 1984. In exceptional cases a term or tenured appointment at the associate professor or professor level will be considered. Preference for one position will be given to an experimentalist in intermediate or high energy physics. Current research interests in the department are radio and optical astronomy and the following specialties in physics: atomic, condensed matter, elementary particle, laser, nuclear, plasma, and space physics. Faculty duties include undergraduate and graduate teaching, guidance of research students and personal research. Interested persons should submit a resume and a statement of research interests and arrange for three letters of recommendation to be sent to Search Committee, Department of Physics and Astronomy, The University of Iowa, Iowa City, IA 52242.

The University of Iowa is an equal opportunity/affirmative action employer.

RESEARCH FACULTY POSITION

DEPARTMENT OF OCEANOGRAPHY
NAVAL POSTGRADUATE SCHOOL

An (adjunct) research faculty position in physical/dynamical oceanography is immediately available; it is expected to continue for several years. A PhD in physical oceanography, meteorology, geophysical fluid dynamics, applied mathematics, physics or engineering is required. The position is dedicated to a program, in synoptic/mesoscale ocean prediction over an open domain, called OPTOMA (Ocean Prediction Through Observations, Modeling, and Analysis). OPTOMA is a joint NPS/Harvard program, sponsored by ONR, which has been in progress for a year-and-a-half. A series of ocean prediction experiments in the eddy field of the California Current System is planned over the next several years. The scientific responsibilities of the position involve: (1) running simulations and prediction experiments with, and evolving, the Harvard statistical-dynamical (a quasi-geostrophic model interacting with a statistical objective analysis) model, (2) participating in seagoing, real-time ocean prediction experiments, often as a chief scientist, (3) conducting data analysis studies, and (4) developing leadership in the physical interpretation of synoptic/mesoscale processes. Hence, a strong background in ocean dynamics and an active involvement in numerical modeling are required. In summary, this is an important scientific opportunity for someone interested in combining synoptic work at sea with theory and numerical modeling.

Assets of the Department include a research vessel with ready access to an exciting region of the ocean, free access to an IBM 333 with excellent graphics capabilities, and proximity to the Fleet Numerical Oceanography Center and the Naval Environmental Prediction Research Facility. Links exist to NORDA, the Naval Oceanographic Office, other Navy labs, and NOAA activities, as well as other academic institutions. Altogether, there are over 100 practicing physical oceanographers and meteorologists in the Monterey area. Finally, the Monterey area has spectacular climate and scenery.

We will welcome applications on a continuing basis. However, the initial closing date will be *9 December 1983*. Send a curriculum vitae; statement of professional interests; and names, addresses, and telephone numbers of at least three references to:

Professor Christopher N. K. Mooers
Chairman, Oceanography Department, Code 68Mr
Naval Postgraduate School Monterey, CA 93943
Telephone: (408) 646-2673

The Naval Postgraduate School is an Affirmative Action/Equal Opportunity Employer.

National Center for Atmospheric Research/Visitor Applicants. At the High Altitude Observatory, Visitor Appointments are available for new and established Ph.D.'s for up to one year periods to carry out research in solar physics, solar-terrestrial physics, and related subjects. Applicants should provide a curriculum vitae including education, work experience, publications, the names of three scientists familiar with their work, and a statement of their research plans. Applications must be received by January 15, 1984, and they should be sent to: HAO Visitor Committee, High Altitude Observatory, National Center for Atmospheric Research, P.O. Box 3000, Boulder, Colorado 80307.

NCAR is an Equal Opportunity/Affirmative Action Employer.

Faculty Position/Arizona State University, Department of Geology. Applications are invited for a tenure-track faculty position at the assistant professor level, beginning in August of 1984.

The selected candidate will be expected to display excellence in teaching and to develop a vigorous program of research on important geological problems. Possible research areas which would complement or extend existing strengths in the department include solid earth/crustal geophysics, seismology, and mineral physics.

Please send a detailed statement of research and teaching interests and a resume with names of four references by January 15, 1984 to Paul Knauth, Chairman, Department of Geology, Arizona State University, Tempe, AZ 85287.

Arizona State University is an equal opportunity/affirmative action employer.

The University of Mississippi/Tenure-Track Assistant Professor. The Department of Geology/Geological Engineering, University of Mississippi has a tenure-track Assistant Professor opening beginning Fall Semester 1984. The position, which is contingent upon FY 1984 funding, is open to the following geoscience specialties in descending order of priority: Geohydrology, Geochemistry, Stratigraphy and Geological Engineering. A PhD is required. The closing date for application is May 1, 1984. Send a resume and the names, addresses and phone numbers of at least three references to: Professor G. Brunton, Chairman, Department of Geology/Geological Engineering, University of Mississippi, University, MS 38677.

Equal Opportunity Employer.

Ohio State University/Mineralogist. The Department of Geology and Mineralogy invites applications for a tenure track position in mineralogy or mineralogy/petrology (this is a position that has been reopened). The successful applicant will be expected to interact with other members of the faculty in the fields of mineralogy, petrology, geochemistry, and economic geology.

A Ph.D. or equivalent is required. The successful applicant will be expected to teach graduate and undergraduate courses, conduct research, and supervise graduate students. Rank and salary will be commensurate with experience and research record.

Please send applications to:

Dr. David H. Elliot
Chairman, Search Committee
Department of Geology and Mineralogy
The Ohio State University
Columbus, OH 43210

Applications should include resume, statement of research record and interests, and the names of at least three persons who can provide recommendations. The closing date for applications is December 31, 1983; the appointment will be effective no later than October 1, 1984. Additional information can be obtained by writing or calling (614) 422-6531.

The Ohio State University is an equal opportunity/affirmative action employer.

Texas A&M University/Geological Oceanography Positions. The Ocean Drilling Project (ODP) invites applications for the following anticipated positions: Several full-time staff scientists (Ph.D.) required. These openings, in various fields of marine geoscience, are anticipated to be filled over a one year period commencing 1 October 1983. The individuals will be responsible for coordinating activities prior and subsequent to the cruises, including the publication of results. The successful candidates will be expected to attend the JOIDES panel meetings relating to their scientific expertise. Several full-time marine technicians. Previous shipboard experience and undergraduate degree in geology or related science highly desirable. These positions require participation of about 6 months per year (alternating two months on and two months off) aboard a scientific drillship charter.

Applicants should submit a letter of application, curriculum vitae, and names of 3 references to: Dr. Philip D. Rabinowitz, Project Director, ODP, Dept. of Oceanography, Texas A&M University, College Station, TX 77843.

An Equal Opportunity Employer.

Faculty Opening/Department of Geological Sciences, Rutgers University, Newark. Tenure-track Assistant Professorship with research and teaching interest at both the undergraduate and graduate levels in Hydrogeology or Geophysics. The appointee will also be required to teach Structural Geology at the undergraduate level. Ph.D. required, publication record and/or experience desirable. Position available July 1, 1984. Salary commensurate with qualifications and experience.

Applicants should submit a resume, names of three references and a statement of research interest by March 31, 1984, to:

Dr. Andreas H. Vassiliou, Chairman
Department of Geological Sciences
Rutgers University
Newark, New Jersey 07102

Rutgers University is an Equal Opportunity/Affirmative Action Employer.

Northern Illinois University/Geophysicist. The Department of Geology seeks to fill a tenure-track position in geophysics beginning August 15, 1984. Candidates with experience in applied seismology are particularly encouraged to apply. Appointment will be at the rank of Assistant Professor. Post-doctoral experience is considered important, and the successful candidate will be expected to develop an aggressive research program, teach at both the graduate (Ph.D. and M.S.) and undergraduate levels, and interact with an active group of faculty and students in geophysics. Send resume, statement of research interests, and the names of three references to: Chair, Geophysics Search Committee, Department of Geology, Northern Illinois University, DeKalb, IL 60115. Application deadline is February 1, 1984.

Northern Illinois University is an equal opportunity/affirmative action employer.

University of California/Faculty Appointments. The Department of Geology and Geophysics at the University of California, Berkeley, CA. 94720, pending budgetary approval, expects to make two faculty appointments effective Fall 1984, one at the junior level and one at the senior level. Applicants must be interested in pursuing a vigorous research program and in teaching both undergraduate and graduate students. The preferred areas of specialization are sedimentary petrology and sedimentology, stratigraphy and petroleum geology, regional tectonics, geochemistry, economic geology, and metamorphic geology. Applications, including the names of references, should be sent to the Chairman at the above address by January 15, 1984.

The University of California is an Equal Opportunity/Affirmative Action Employer.

Texas A&M University/Deputy Department Head. The Department of Oceanography in the College of Geosciences at Texas A&M University is seeking a deputy department head to assist in the academic and administrative functions in the Department. Duties will involve 75 percent administration and 25 percent research or teaching on a 12-month appointment basis. This is a tenure track position and will be filled at an academic level commensurate with the experience of the applicant. Applicant must have demonstrated administrative ability, an established record in research and an interest in teaching at both undergraduate and graduate levels of Oceanography. Closing date for applications is 15 December 1983. Effective date of this appointment will be 1 January 1984.

TAMU is an equal opportunity/affirmative action employer.

Duke University/Tenure-Track Position. The Department of Geology is seeking applicants for a tenure-track position in the general field of Paleontology/Sedimentary Geology. Rank for the position is at the Assistant Professor level and the PhD is required. Undergraduate teaching responsibilities include Historical Geology and Invertebrate Paleontology. The appointee will be expected to develop graduate level courses, to initiate a research program, and to direct graduate students at both the MS and PhD levels. An opportunity exists to offer courses and conduct research at the Duke Marine Laboratory. The position is to be filled by September, 1984 with a closing date of December 31, 1983 for the acceptance of applications.

Interested applicants should send a resume and the names and addresses of three references to Chairman, Department of Geology, Duke University, Box 6729 College Station, Durham, North Carolina 27708.

Duke University is an equal opportunity/affirmative action employer.

Massachusetts Institute of Technology

Marine Geology and Geophysics

EXTENDED DEADLINE

The Department of Earth, Atmospheric, and Planetary Sciences has an opening for a junior or senior faculty member in marine geology and geophysics. The candidate should have a strong interest in obtaining and analyzing geological and geophysical data and be prepared to participate in cruises. Specializations could include tectonics at mid-ocean ridges or island arcs, continental margin evolution, basin evolution or paleo-oceanography. The candidate would be expected to interact with such fields in the department as regional tectonics, seismology, marine geology and geophysics, sedimentology, or chemical oceanography, and to participate in the Joint Program in Oceanography with the Woods Hole Oceanographic Institution.

Applicants should submit resume and list of references by 15 January 1984 to:

William F. Brace
Chairman
Dept. of Earth, Atmospheric,
and Planetary Sciences
54–916, M.I.T.
Cambridge, MA 02139

M.I.T. is an Equal Opportunity/Affirmative Action Employer.

Princeton University/Faculty Appointment. The Department of Civil Engineering at Princeton University invites applications for a faculty appointment in the Water Resources Program beginning September 1984. Responsibilities include graduate and undergraduate teaching in fluid mechanics, surface water hydraulics, and numerical methods, and development of and participation in a research program related to surface and subsurface hydraulic and hydrologic systems. Candidates must have a Ph.D. degree with demonstrated teaching ability and scholarship. Submit resume and three references to George F. Pinder, Chairman, Department of Civil Engineering, Princeton University, Princeton, NJ 08544.

Princeton University is an affirmative action/equal opportunity employer.

Arizona State University/Geochemistry Research Specialist. To operate and modify automated SEM facility for aerosol particle analysis in atmospheric geochemistry research. Software development and SEM/EDS experience necessary. Ph.D. optional. Competitive salary. Send resume, statement of experience to personnel, Arizona State University, Tempe, Arizona 85287 and names of three references to Dr. P.R. Buseck, Depts. of Geology and Chemistry.

ASU is an EO/AA employer.

Hamilton College/Faculty Position. Applications are invited for a tenure-track position starting September 1984 at the Assistant Professor level. This position will expand the department from three to four faculty members. We seek a person with a PhD who is strongly oriented toward undergraduate teaching and whose field of training and interests are in any of the following fields: geophysics, low-temperature geochemistry, oceanography. Highly qualified candidates in other areas will also be considered. The successful candidate will be expected to contribute to introductory courses offered by the department, teach advanced undergraduate courses, and maintain a research program.

Hamilton is a private, coeducational liberal arts college with 1000 students. The department has an active program with 10–15 majors in each class, excellent facilities and equipment, and a strong emphasis on field work.

Candidates should send letters of application, resumes, transcripts, and three letters of recommendation to: Donald B. Potter, Chairman, Department of Geology, Hamilton College, Clinton, NY 13323.

Hamilton College is an equal opportunity employer. Women and minorities are encouraged to apply.

Geophysicist Tenure-Track Appointment/Department of Geology, University of Toledo. The position is effective September 1, 1984. Individuals with strong backgrounds in exploration geophysics—applied geophysics are of primary interest although other specializations will be considered. The Ph.D. is required as well as a strong commitment to effective teaching and research. The department has modern facilities and offers B.S., B.A., and M.S. degrees to approximately 60 undergraduate and 30 graduate students. The faculty consists of eight full time and five adjunct professors actively involved in a wide range of research pursuits. Interested persons should submit a letter of application, resume, transcripts, and three letters of recommendation to: Stuart L. Dean, Chairman of Search Committee, Department of Geology, University of Toledo, Toledo, Ohio 43606, phone (419) 537-2446 or (419) 537-2009.

University of Toledo is an equal opportunity/affirmative action employer.

Staff Scientists/Systems Analysts. Research and Data Systems, Inc. has openings available for Staff Scientists, Systems Analysts and Programmer/Analysts to work in areas involved in the processing and application of data from satellite based remote sensing systems. Particular needs involve the analysis and processing of Earth Radiation Budget, Microwave, AVHRR and LANDSAT data. Needs also exist in the areas of interactive image graphics, software engineering, realtime processing and satellite data communications. Successful candidates will have an advanced degree in meteorology, physics, engineering, mathematics, or computer sciences. Hardware background should include IBM, DEC, CYBER or HP-1000 equipment. Send resume in confidence to:

Research and Data Systems, Inc.
10300 Greenbelt Road, Suite 206
Lanham, Maryland 20706
Telephone: (301) 390-6100

Boston University/Faculty Position. The Astronomy Department at Boston University expects to have a faculty position available beginning either January or September 1984, extending at least through the 1984/85 academic year. Applicants are sought who have teaching experience and who have a proven research record as evidenced by publications and recommendations. Research programs in the department include ionospheric and magnetospheric physics, galactic astronomy, and extragalactic and high energy astrophysics. Applicants with research programs in any of these areas will be considered; however, preference will be given to those with experimental or observational interests.

Equal consideration will be given to individuals wishing to start in January or September 1984. Depending on the future availability of funds, this position may be converted to a permanent line leading to eventual tenure.

Please send a curriculum vitae, names of three persons who can provide an evaluation of your teaching and research and a brief statement of current research interests to:

Kenneth Janes, Chairman
Astronomy Department
Boston University
725 Commonwealth Avenue
Boston, MA 02215
(617) 353-2057

Boston University is an Equal Opportunity/Affirmative Action Employer.

Igneous/Metamorphic Petrologist or Structural Geologist/Hobart and William Smith Colleges. The Department of Geoscience of these private, coordinate, liberal arts colleges seeks applicants for a full-time, tenure-track position for September, 1984. We need a field-oriented, igneous or metamorphic petrologist or structural geologist, a person committed to excellence in teaching and to stimulation of undergraduate research. Ph.D. required and teaching experience desirable. Teaching includes introductory courses, mineralogy, petrology and structure plus participation in the Colleges' general curriculum. Research encouraged and supported. Submit Vitae and three letters of recommendation to: Donald L. Woodrow, Department of Geoscience, Hobart and William Smith Colleges, Geneva, NY 14456. Applications from women and members of minority groups encouraged.

Hobart and William Smith Colleges are equal opportunity/affirmative action employers.

Research Observer/U.S. Department of Commerce. Position in Barrow, Alaska. Conducts scientific measurements at the NOAA Baseline Observatory in Barrow, Alaska. Will make measurements of atmospheric CO_2, ozone, aerosols, other trace constituents, and meteorological parameters. This position is an electronics specialist (instrument). Responsibilities are calibration and maintenance of the Observatory instruments and NOVA minicomputer. We seek applicants with electronics technician background with at least 4 years of experience or electronics engineers with at least 2 years experience. The experience should be specialized in electronic instrumentation calibration and maintenance.

This is a 15–24 month appointment. Duty station for the first two months will be in Boulder, Colorado for orientation and training, then at Barrow, Alaska. NOAA will supply bachelor quarters at reasonable cost in Barrow. The Observatory is within 6 miles of Barrow, a community of about 2000 people. The measurements supply information for current atmospheric research into climate and climate change. We offer an adventure as well as good salary (about \$30,000–\$40,000 per year, depending on qualifications and experience). For more information, contact Mr. Bernard Mendonca, U.S. Dept. of Commerce/NOAA, 325 Broadway, Boulder, Colorado 80303; telephone FTS 320-6733 or Commercial (303) 497-6733.

NOAA is an equal opportunity employer.

Physical Scientist/National Center for Atmospheric Research. Provides skilled support to research group involved in atmospheric chemistry and radiative transfer. Areas of activity include: synthesis and interpretation of infrared spectra, Fourier analysis, new analysis procedures for data from advanced instruments, FORTRAN programming and organization and maintenance of large data base. Appointment will be at Support Scientist III/IV level in NCAR's Atmospheric Chemistry and Aeronomy Division. Apply with resume to NCAR, Attention: Esther Blaton, PO Box 3000, Boulder, Colorado, 80307, by 20 December 1983, or call (303) 497-1038 or (303) 497-1674 for further information.

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH is an Equal Opportunity/Affirmative Action Employer.

Ohio State University/Seismologist-Tectonophysicist. The Department of Geology and Mineralogy, The Ohio State University, invites applications for a tenure-track position for a geophysicist with research interests in seismology and/or tectonophysics. The successful applicant must be prepared to assist in teaching exploration geophysics courses, advanced topics in his/her specialty, conduct research, and supervise graduate students. Preference will be given to candidates with post-doctoral or industrial experience. Rank and salary commensurate with experience and research record. Please send applications or nominations as soon as possible to:

Dr. Ralph R.B. von Frese
Chairman, Search Committee
Department of Geology and Mineralogy
The Ohio State University
Columbus, OH 43210
Phone: (614) 422-5696 or 422-2721

Applications should include a resume, a statement of research interests and the names of at least three persons whom we may contact for recommendations. The closing date for applications is December 23, 1983; appointments will be effective no later than October 1, 1984. Additional information can be obtained by writing or calling the search committee chairman.

The Ohio State University is an equal opportunity/affirmative action employer.

Atmospheric Physicist/Northern Arizona University. Tenure-track assistant professor available January 10, 1984 (or August, 1984) in an eleven-man Physics Department with a joint appointment in Computer Science. Teaching is at the undergraduate level with approximately one-half time devoted to teaching courses related to laboratory applications of computers. Knowledge of FORTRAN at least one assembly language, and fundamental digital logic is essential. Approximately one-half time will be devoted to teaching and research in Physics. Areas of research interest could include radiative transfer, mesoscale dynamics, orographic flows and/or meteorological/environmental instrumentation including remote sensing. Send a complete resume, statement of research interest and professional goals and names of three references to: Dr. Kenneth Odell, Chairperson, Department of Physics, Box 6010, Northern Arizona University, Flagstaff, AZ 86011.

Applications received prior to November 30 will receive full consideration. Ph.D. required. Academic salary range \$20,000–25,000.

NAU is an Affirmative Action/Equal Opportunity Employer.

Louisiana State University/Tenure-Track Faculty Positions in Geology. The Department of Geology is expanding from 15 to 35 faculty with four positions open Fall 1984 and one position (Field Camp Director) open January 1984. Candidates must have the Ph.D. and have active research in progress that might be applied to studies of basins. Specialties of primary interest are hard rock geology, theoretical seismology, hydrogeology, and organic geochemistry; however, other disciplines will also be considered with quality of research being the primary factor in applicant selection. All faculty in the Department are required to conduct research leading to publications and to provide quality instruction. The Department will expand into a new building January 1986.

For consideration send resume, three letters of reference and a description of research to Lyle McGinnis, Faculty Search, Department of Geology, Louisiana State University, Baton Rouge, LA 70803–4101. Search will remain open until positions are filled.

LOUISIANA STATE UNIVERSITY IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY EMPLOYER.

Ralph M. Parsons Laboratory for Water Resources and Hydrodynamics/Assistant or Associate Professor. The Department of Civil Engineering has a position in Water Resource Systems and Planning at the Assistant or Associate Professor level. The applicant will provide teaching and research on the analysis, management, and design of large scale water resource systems. Training in Water Resources Engineering, Project Management, Applied Economics, Systems Analysis and/or Statistics as well as some practical applications experience are important selection criteria. The applicant will be responsible for graduate and undergraduate teaching and for developing theoretical and applied research within an existing interdisciplinary Water Resources and Hydrology Group. Interaction with the Department's new Center for Construction Research and Education in the areas of large scale projects and infrastructure planning is also possible. Research specialties might include but are not limited to: Large Scale System Analysis, Planning and Capacity Expansion of Water Systems Under Uncertainty, Urban Water Management, Water/Energy Interactions, Infrastructure Planning, Supply/Demand Interaction, or other sectoral problems, related to the Engineering Analysis of Water Resource Systems.

Please contact:

Professor Rafael L. Bras
Ralph M. Parsons Laboratory
Room 48-311
Massachusetts Institute of Technology
Cambridge, MA 02139
(617) 253-2117

M.I.T. is an affirmative action/equal opportunity employer.

Scientist. To use atmospheric modeling techniques to support satellite retrieval of physical parameters for climate analysis and weather forecasting. Ph.D. in Atmospheric Science or Meteorology required. No work experience required but knowledge of the following is necessary: climate and satellite data analysis, numerical analysis, vector processing, large scale spectral modeling of the atmosphere, stratospheric ozone analysis and FORTRAN programming. Salary for 40 hour week \$26,624 per year. Send resume to: Suite 931, 1861 K St., N.W., Washington, DC 20005.

POSITIONS WANTED

TRANSLATORS. Free lance, Russian to English with expertise in seismology, tectonics, mathematical aspects of geology, aeronomy, dynamic meteorology or physical oceanography. Excellent knowledge of Russian and ability to write idiomatic English required. Write to: Scripta Publishing Co., 7961 Eastern Ave., Silver Spring, MD 20910.

STUDENT OPPORTUNITIES

Graduate Teaching and Research Assistantships in Marine Environmental Sciences and Coastal Oceanography. Opportunities for graduate study with graduate teaching and research assistantships available for students interested in the M.S. program in Marine Environmental Sciences and the Ph.D. program in Coastal Oceanography. Awards cover tuition and academic year stipends up to \$7,290. Additional summer support also available up to \$3000. Write: Graduate Program Chairman, Marine Sciences Research Center, State University of New York, Stony Brook, N.Y. 11794.

State University of New York does not discriminate on the basis of race, sex, religion, national origin, age, physical disability or marital status, in admissions, hiring, and treatment of either students or employees.

GRADUATE STUDENT NASA TRAINEESHIPS

The Florida State University is accepting applications from prospective graduate students for participation in its NASA sponsored Traineeship Program in Oceanographic Remote Sensing Techniques and Physics of Air-Sea Interaction. The stipend for the calendar year is \$10,600. Students may be enrolled for a degree in either oceanography or meteorology. For further information or application, please write:

Dr. James J. O'Brien
NASA Traineeship Program
Meteorology Annex
The Florida State University
Tallahassee, Florida 32306
(904) 644-4581

University of Miami/Graduate Research Assistantships in Physical Oceanography and Meteorology. The Division of Meteorology and Physical Oceanography, School of Marine and Atmospheric Science, University of Miami, invites applications from students in science or engineering with a strong background in physics and mathematics and an interest in either the atmosphere, the ocean or their mutual interaction. Successful applicants may pursue either a M.S. or Ph.D. involving work in a wide range of observational/experimental or theoretical research. Remuneration includes tuition (\$5,280, last year) plus a yearly stipend of \$10,550 for applicants entering the M.S. program and \$11,050 for students in the Ph.D. program. Research Assistantships begin 1 September, 1984, but summer research work may be available earlier to some accepted students. For details and/or application write: Dr. Friedrich Schott, Division of Meteorology and Physical Oceanography, Rosenstiel School of Marine and Atmospheric Science, University of Miami, 4600 Rickenbacker Cswy, Miami, FL 33149.

AGU

Union Candidates

Eos is carrying biographies and photographs of all candidates for President-elect, General Secretary, and Foreign Secretary of the Union and for President-elect and Secretary of each Section. In addition, statements by the candidates for Union offices and for Section President-elect will appear. The material for the Union-wide candidates appears this week. The sections and the date of the issue in which the material for their candidates appeared are as follows:

Geodesy; Geomagnetism and Paleomagnetism August 30
Planetology and Planetology petition candidate August 30 and October 18
Atmospheric Sciences September 27
Tectonophysics October 11
Seismology October 18
Hydrology October 25
Ocean Sciences November 1
Volcanology, Geochemistry, and Petrology November 8
Solar-Planetary Relationships November 15

The slate of candidates for all offices was carried in the June 21 issue.

Union: President-elect

John D. Bredehoeft A member of AGU since 1963; 50 years old. Regional Hydrologist, Water Resources Division, U.S. Geological Survey, Menlo Park, Calif.; Visiting Scholar, Department of Applied Earth Sciences, Stanford University. Major interests: water resources; groundwater hydrology; role of groundwater in tectonic processes. B.S.E. in geological engineering, Princeton, 1955; Ph.D. in geology, Illinois, 1962. Exploration geologist, Humble Oil, Utah, 1957–1959; research assistant, Illinois State Geological Survey, 1960; groundwater research, U.S. Geological Survey, since 1962; visiting faculty member, Illinois, 1967–1968; on loan to Resources for the Future, 1968–1970; directed water research for the U.S. Geological Survey, 1974–1979; Regional Hydrologist, Western Region, since 1980.

Fellow: AGU, GSA. Served on a number of committees: member at large, Geophysics Research Board (NAS-NRC); Geophysics Study Committee (NAS-NRC); Committee on Rock Mechanics (NAS-NRC); Chairman, Ad Hoc Committee: Utilization of Numerical Ground Water Models for Water Resources Management (SCOPE-ICSU); Chairman, International Hydrologic Program work group: Ground Water Models for Management (UNESCO). Published 56 papers; 22 in AGU publications, including 16 in WRR, 4 in JGR; coauthor of *Water Resources Monograph 5*. Recipient, 1974, Interdisciplinary Award—U.S. Committee on Rock Mechanics for the paper C. B. Raleigh, J. Healy, and J. D. Bredehoeft, 1972, "Faulting and crustal stress at Rangely, Colorado"; 1975, AGU Horton Award for the paper G. F. Pinder and J. D. Bredehoeft, 1968, "Application of the digital computer for aquifer evaluation"; 1975, GSA, Meinzer Award for the paper J. D. Bredehoeft and G. F. Pinder, 1973, "Mass transport in flowing ground water"; Meritorious and Distinguished Service Awards (DOI). Chairman, AGU Water Resources Monograph Board.

Statement

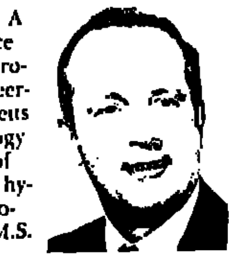
"In examing a number of issues facing society today, especially those with which I am most familiar and in which water plays an important role, I am struck by the fact that the solution to many of these problems requires new scientific understanding. Many of the more challenging and interesting problems transcend the bounds of traditional disciplines—earthquake prediction, induced seismicity, nuclear waste disposal, toxic waste disposal, and groundwater contamination, to name a few.

"Two of these examples will illustrate my point. Hubbert and Rubey, in their classic paper on the role of fluid pressure in overthrusting, pointed out the importance of fluid pressure in controlling the state of stress within the earth. The subsequent experiment at Rangely, Colo., demonstrated that earthquakes could be controlled by manipulating the fluid pressure. Our efforts at Rangely required a team with an understanding of rock mechanics, seismology, and reservoir engineering.

"The current focus on groundwater contamination provides another good example. More and more the bigger problem appears to be contamination by man-made organic compounds. Many of the reactions which take place with these compounds are biologically controlled. The scientific problem is one of predicting the physical transport of a set of organic compounds in which chemical reactions are taking place, some of which are clearly biologically controlled. Problems such as these cannot be solved by hydrologists alone; if they are to be solved they will require the interdisciplinary attack of diverse areas of the geophysical disciplines. It is my aspiration, were I to be elected, that we could move toward closer integration of the entire community of geophysicists. Integrations involving hydrology are but one example of other interdisciplinary efforts possible.

"One of the exciting ideas in earth sciences today is the Continental Scientific Drilling Program. The concept is not new; it has been discussed for at least the last 10 years. It now seems that the academic community is assembling a consortium which could give the Program sufficient impetus to make it a viable reality. AGU can, I believe, play an important role in providing a forum for open discussion of the Program and in providing a vehicle for advertising in the best sense.

"The American Geophysical Union has played a prominent role in the history of hydrology in this country. One continues to hear stories about famous AGU meetings in the 1930's, 1940's, and 1950's at which heated debates took place amongst the pioneers of hydrologic science over basic principles. Many of the most significant advances in hydrology were published in the *Transactions* of AGU. Today, *Water Resources Research* is the premier scientific journal in hydrology in the world. Hydrology continues to be the largest section within the Union with more than 2,000 members. As a hydrologist I recognize the important role AGU has played in the past and continues to play for hydrologists in providing both a forum for discussion as well as journals of scientific excellence. I am fully aware that AGU has performed the same important functions for other areas of the geophysical sciences. It is with this tradition firmly in mind that I view the activities of the Union, as well as my own election."



Peter S. Eagleson A member of AGU since 1955; 55 years old. Professor of Civil Engineering at the Massachusetts Institute of Technology (MIT). Major areas of scientific interest are hydrology and climatology. B.S. (1949) and M.S. (1952) from Lehigh University and the Sc.D. (1956) from MIT. Has held faculty positions at MIT since 1955 and from 1970–1975 was Head of its Department of Civil Engineering. Member of ASCE and IAHS, the Committee on Hydrology of AMS, the U.S. National Committee of IAHS, the NASA Science Working Group for Land-Related Global Habitability, and the NRC Water Science and Technology Board. Has been chairman of the GARP Working Group on Land Surface Processes, member of the Drafting Group of the U.S. Climate Program 5-year plan, and various NRC panels on Remote Sensing in Earth Science.

Author of 65 publications, 18 in AGU journals, author of the textbook *Dynamic Hydrology* (1970), and editor of the book *Land Surface Processes in Atmospheric General Circulation Models* (1982). Honors include: Member, National Academy of Engineering (1982); Horton Award of AGU Hydrology Section (1979); Fellow, AGU (1979); Herschel Prize, BSCE (1965); Huber Prize, ASCE (1963); Fitzgerald Medal, BSCE (1959). Currently president of the AGU Hydrology Section and a member of the U.S. National Committee for IUGG. Previously served on the AGU Fellows Committee and as Chairman of its Horton Medal subcommittee.

Statement

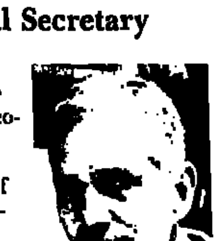
"The scientific and fiscal health of the Union has never been better and consequently I foresee no major changes should I become its president. There are several areas of particular concern to me, however.

"The Union's publications are at once its raison d'etre and the wellspring of its solvency. If elected I would give first priority to maintaining the preeminence of our existing journals and monographs while exploring vigorously the opportunities for expanding this service we provide to the scientific community. This would require continuing attention to the control of publication cost and to its equitable allocation among author, reader, and archival institution.

"Increasingly, there is need to address scientific problems which span the interests of more than one of our discipline-oriented Sections. As classicist William Arrowsmith once said, "We have integrated problems and disintegrated skills. . ." Some examples of integrated geophysical problems from my own areas of interest are acid rain, drought, regional climate change, and global habitability. If elected I would seek ways of increasing the flexibility and effectiveness of the Union in focusing attention on such multidisciplinary problems. Mechanisms to accomplish this might include Union-wide technical committees and their sponsorship of Union-wide technical sessions, increased use of *Eos* for scientific articles of multidisciplinary interest, and perhaps even the formation of one or more new Sections in order to bring into the Union disciplines not well represented. In this last case, I think first of biogeochemical cycles. Certainly, a key component in understanding the earth as a living planet is the cycling of its constituent elements. Perhaps biogeochemistry should have a formal home within the Union.

"Finally, I am also interested in the problem of the scientist as citizen and in the role of the Union both in enhancing scientists' understanding of science policy issues and in facilitating their participation in public affairs."

Union: General Secretary



Peter M. Bell A member of AGU since 1969; 49 years old. Geophysicist at the Geophysical Laboratory, Carnegie Institution of Washington; Major interests: high-pressure experimental geophysics and spectroscopy. B.S., S.L.U., 1956; M.S., University of Cincinnati, 1959; A.M., Harvard University, 1962; Ph.D., Harvard University, 1963. Post-Doctoral Fellow, 1963–1964, Faculty since 1964, Geophysical Laboratory; Fellow, AGU (since 1969), MSA; Member P.G.S. (Vice-President) G.S.W., G.S., G.S.A.; Committees, NRC-Earth Science, Pet. Res. Fund ACS, U.S. National Committee Inter. Geol. Corr. Prog.; Editor, *Eos*; Associate Editor, *Physics and Chemistry of Minerals*; Editorial Board, *Science*, *Advances in Geochemistry*.

Awards, Apollo XI, Skylab, Skylab II, NASA Medal Highest Sci. Achievement, 1976; Nat. Geo. Soc. Award, 1978; Guggenheim, 1981; Cal. Inst. Tec. Fairchild Dist. Schl., 1983; total number of scientific research publications, 211; 8 in AGU journals (plus numerous articles in *Eos*).

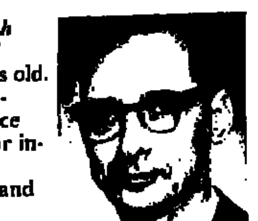
Statement

"The American Geophysical Union has become an effective interacting agent and functional representative of the Atmospheric, Planetary, Oceanographic, and Earth Sciences community during the past 20 years. AGU membership has increased during this period several hundred percent, and the number of journals and publications of the Union has increased from 2 to more than 20. Budgets of AGU have risen in this time span from the thousand dollar levels to an increasing figure of several million dollars per year. These factors constitute ample evidence of the success of AGU. At the same time, the growing numbers of members, activities, meetings, publications, and finances of the Union are factors of great concern for the membership. The concerns range from day-to-day management of a complex, multimillion dollar operation to the degree to which this operation is effective in meeting its primary goals of fostering scientific communications.

"The duties of General Secretary of the Union are to oversee these functions on a regular basis. The General Secretary thus may serve to focus concerns of the membership. As AGU grows and seeks to provide a major medium for communication within the scientific community, its policies must be modified and updated regularly. The General Secretary does not create new policy but does have the responsibility of overseeing its implementation, which is no trivial task.

"Perhaps of most urgent interest for the AGU membership are the changes in new-generation computational techniques that are to be utilized by the Union for a range of functions extending from in-house accounting procedures to possibilities of developing systems for scientific communication and storage that would be made routinely available to members. The urgency arises from the fact that changeovers in computation are already underway at AGU.

"There has been a long-standing concern about methods of improving the handling of scientific manuscripts and data. It appears that AGU, in continuing its efforts toward initiating innovative procedures of handling scientific communications, may have the opportunity to exploit electronic processing techniques in the near future. AGU is moving ahead in these areas and should be commended. At the same time, the role of General Secretary to oversee this progress has never been more decisively important."



Leslie H. Meredith A member of AGU since 1959; 55 years old. Director of Applications, Goddard Space Flight Center. Major interests: the coupled ocean-atmosphere-land system. B.A., M.S., Ph.D., (1954), University of Iowa. Naval Research Laboratory until 1958 when headed Rocket Sonde Branch. Goddard from 1958 to present with several positions other than current one including head of the Space Sciences Division and Acting Center Director. Member of APS, AAAS, and Fellow RAS. 40 publications with 5 in AGU journals. Honors: Phi Beta Kappa, Sigma Xi, NASA's Scientific

AGU (cont. on p. 950)

AGU *(cont. from p. 949)*

Achievement and Leadership Medals, Presidential Rank Award, AGU Budget and Finance Committee member and General Secretary.

Statement

"There is no question but that AGU provides the most important mechanism for the exchange and documentation of geophysical information to the scientists of the world. Continuation of this important mechanism requires that the Union be strong fiscally. In my candidacy statement of 4 years ago, however, I expressed the opinion that while the Union needs to be fiscally strong this should not be viewed as an end in itself but only as a necessary part in the Union achieving its larger objectives. Since that time, under the leadership of presidents Wilson and Van Allen, significant progress in this direction has been achieved. In particular, the Union's fiscal health has markedly improved while at the same time there have been significant increases in the size of the membership, meeting attendance, journal pages published, and quality of service to the members, as well as significant decreases in publication lead times and staff turnover at AGU Headquarters. Opportunities now exist for AGU to build on its notable achievements and to be of even more service in the future to its members and the geophysical community. I will continue to try to help in this process in whatever roles are appropriate."

Union: Foreign Secretary

Louis J. Battan A member of AGU since 1948; 60 years old. Professor atmospheric sciences, Institute of Atmospheric Physics, University of Arizona. Major interests: radar meteorology, cloud physics, severe local storms, and weather modification. Degrees in meteorology: B.S., NYU, 1946; M.S. in 1949, Ph.D. in 1953, University of Chicago. Weather officer, Army Air Corps, 1944–1946; research meteorologist, U.S. Weather Bureau, 1947–1951; research associate and lecturer, University of Chicago, 1953–1958; professor, 1958 to present, director of Institute of Atmospheric Physics, University of Arizona, 1972–1982. Fellow, AGU, AMS, AAAS; Member, Sigma Xi; president and councilor, AMS; councilor, secretary, Section W, AAAS. Served on many committees such as: Chairman, Committee on Atmospheric Sciences, NAS; Chairman, Panel on Low-Altitude Wind Variability, NAS; vice-chairman, Geophysics Study Committee, NAS; Chairman, USNC for IUGG; member, National Committee on Oceans and Atmosphere; Member, Board of Trustees, University Corporation for Atmospheric Research; Chairman, Planning Commission AMS. Editorial boards: *Nuovo Cimento, C; Weatherwise; Encyclopaedia Britannica Yearbook of Science and the Future.* Author or coauthor of 16 books; chapters or articles in 7 books; about 70 articles in refereed journals, 4 published by AGU. From AMS: Meisinger Award; Brooks Award; Second Half Century Award. Service in AGU: Vice-President and President, Meteorology Section; Fellows Committee; Membership Committee; Committee on International Participation.

Statement

"The American Geophysical Union exists because there is a unity to geophysics that must be nurtured and guided if we are to develop a deep and meaningful understanding of the planet on which we live. This concept is often stated but just as often ignored, because of the pressures to earn a living and the tendency for specialization encouraged by our educational and research establishments.

"By its very nature, AGU brings together many geophysical specialists and encourages us—even forces us—to talk and think together. With each passing year, it becomes increasingly evident that many of the major problems of the oceans, the atmosphere, and the land masses are intertwined. For example, to understand the climate of the earth and how it has varied over time scales from 10^{0} to 10^{9} years, one must bring into consideration most of the subdisciplines of geophysics. It also is evident that problems such as this one require a global perspective. All nations share the same atmosphere, are influenced by all the oceans, and sit on shifting plates whose boundaries pay no heed to the people or countries that happen to be above them.

"In order to deal effectively with many of the most crucial geophysical problems of the day, it is essential to carry out research programs on a global scale. Satellites allow us to make many important geophysical measurements, but many still have to be made in situ in all parts of the world. This requires international cooperation, collaboration, and the sharing of information. AGU is in a unique position to encourage such actions; the Committee on International Participation is the one that can advise AGU on how to achieve these worthy objectives."

Juan G. Roederer A member of AGU since 1965; 53 years old. Naturalized U.S. citizen. Director of the Geophysical Institute of the University of Alaska. Current interests: magnetospheric plasma physics, radiation belts, numerical modeling, psychoacoustics. Doctor of Science (physics), University of Buenos Aires, 1952. Fluent in Spanish, German, Italian, and French. Group leader, Argentine AEC, 1953–1962; director, Argentine National Cosmic Ray Center, 1962–1966; professor of physics: University of Buenos Aires (1959–1966), University of Denver (1966–1977), University of Alaska, Fairbanks (since 1977); Visiting Staff Member, Los Alamos Scientific Laboratory, 1968–1981. Fellow, AGU and AAAS, cited for "fundamental contributions to magnetospheric physics and to international cooperation in this field"; member, American Acoustical Society and Asociación Argentina de Geofísicos y Geodestas. Member, NAS/NRC Polar Research Board; was member and chairman of several NAS/NRC committees.

Current international activities: past-president of IAGA, vice president of SCOSTEP, IUGG representative in the COSPAR Executive Council. Past: member, IAGA Executive Committee, 1967–1975; IAGA President, 1975–1979; member, SCOSTEP Bureau, 1967–1982; organized the International Magnetospheric Study and was chairman of the IMS Steering Committee 1971–1979. Extensive international travel, including USSR and PRC, in advisory capacity and as a lecturer. Over 100 publications, 19 published by AGU; four single-authored books, two translated into other languages (Russian, German, Japanese). Outstanding Educator of America 1975; University Lecturer, University of Denver 1975; listed in seven Who's Whos. Associate Editor, JGR (1969–1971); chairman, AGU Lloyd Berkner Committee (1980–1982); member, AGU Committee on International Participation (1972–1980) and AGU/URSI Joint Board for Radio Science (1972–1976); member, AGU Translations Board (since 1982).

Statement

"The American Geophysical Union is probably the largest private scientific association in the world dealing with geophysics. Accountable only to its members, it does not represent the views of a government or a political establishment. Yet it does represent United States science and, as such, is committed to our country's ideals of freedom of inquiry and freedom of expression.

"AGU's publications are at the top in the international market of scientific literature in geophysics, and AGU's meetings and conferences are considered models for scientific meetings all over the world.

"We have a tendency to take all this for granted—yet, to flourish, excellence has to be constantly confirmed and renewed. To contribute to this process with vigor and foresight should be, in my view, the principal objective of the Union's leadership.

"Dealing with the quantitative understanding of the immediate and distant environments, of the planetary body, and of the related natural and man-made perturbations and hazards, geophysics is one of the scientific disciplines most relevant to the survival of humankind. Unfortunately, our world is governed by individuals with little comprehension of what science is all about and with a limited understanding of why some scientific disciplines are particularly relevant. As an association of geophysicists, we have the obligation not only to further our own scientific discipline, but also to contribute to the public understanding of the role of our science as a venue for human progress and peace among nations. As the Foreign Secretary of AGU I would channel an important part of my effort into that direction. This I would do not only for altruistic reasons: We are entering a period in which the United States will be increasingly dependent on cooperation, trade, and political alliances with other countries. Indeed, the true leadership of our nation, be it in science, economy, or ideology, will depend more and more on how much we are able to inspire, and less and less on how much we are able to dominate.

"Without neglecting our interactions with all countries, I would identify a few world areas to which AGU should pay special attention in terms of promoting professional interactions, membership, joint meetings, joint publications, exchange of young scientists and students, joint research endeavors, and providing editorial guidance and assistance for publication in AGU journals. First and foremost, I would consider the Latin American area, continuing and strengthening the current efforts of CIP. With my own educational background and 15 years of experience as a scientist and science-administrator in Argentina, I would feel comfortable carrying out the task of developing mutually beneficial programs with the Latin American sector. Second, I would choose Western Europe, strengthening our already close ties with the European Geophysical Society. Again, I feel that I qualify to do this (after all, I am a born Italian!). Third, I would select China as an area with an astounding growth of scientific ties with the U.S., particularly in geophysics. And fourth, Eastern Europe and the Soviet Union, whose scientists are longing to intensify their scientific ties with U.S. colleagues, efforts that are perennially frustrated by nonconvertible currency problems and other significant factors. I feel that my 20-plus years of experience in leading positions of international scientific organizations and research projects, and the aggregate 12 months I have spent since 1970 on science business in socialist countries also qualify me to deal with the third and fourth areas above."

New Mineral Physics Panels

The AGU Committee on Mineral Physics has formed itself into six panels. The committee chairman is Orson L. Anderson of the Department of Earth and Space Sciences, University of California, Los Angeles; foreign secretary is Robert Liebermann, Department of Earth and Space Sciences, State University of New York, Stony Brook. The six panels are as follows.

AGU Session Programs
Raymond Jeanloz, chairman, UC Berkeley
Charles Prewitt, SUNY, Stony Brook
David Kohlstedt, Cornell Univ.

Conferences and Publications
Donald Weidner, chairman, SUNY, Stony Brook
Tom Shankland, Los Alamos Nat. Lab.
Alexandra Navrotsky, Univ. of Arizona

Mineral Physics Fellowship Award (Annual Prize)
Murli Manghnani, chairman, Univ. of Hawaii
William Bassett, Cornell Univ.
Leon Thomsen, AMOCO

Membership and Publicity
Robert Hazen, chairman, Geophysical Lab.
Earl Graham, Penn. State Univ.
Sue Kieffer, U.S. Geological Survey

Long-Term Future of Mineral Physics
Orson Anderson, chairman, UCLA
Joe Smith, Univ. of Chicago
Peter Bell, Geophysical Lab.

Nominations
Tom Ahrens, chairman, Cal Tech
Roger Burns, MIT
Daniel F. Weill, Univ. of Oregon
Hartmut Spetzler, Univ. of Colorado
Orson Anderson (ex officio), UCLA

The committee has sponsored six sessions at the 1983 AGU Fall Meeting; they are being cosponsored by AGU's sections of Geomagnetism and Paleomagnetism; Tectonophysics; and Volcanology, Geochemistry, and Petrology. The session titles are as follows:

Physics of Magma Transfer
Mineral Physics at High Pressure
Deformation of Rocks and Minerals
Electrical Properties of the Crust and Mantle
Phase Equilibria
Physical Chemistry of Minerals

Meetings

Announcements

Hydrology at 1984 Spring Meeting

Groundwater Chemical Transport Models

Increasing problems relating to disposal of wastes and the resulting groundwater pollution have focused attention on the mechanisms of contaminant migration in groundwater. The need to design safe, long-term repositories for the nation's radioactive wastes has called attention also to the importance of predicting the fate and migration patterns of groundwater contaminants. Solutions to many of these problems will be approached using computer modeling techniques.

A model is limited by the quality of the data upon which it is based, such as permeability, effective porosity, dispersivity, and chemical reaction parameter values as well as field data used for calibration. A half-day symposium devoted to modern field methods for estimating or measuring parameters and data needed to support chemical transport models will be held at the 1984 AGU Spring Meeting in Cincinnati, May 14–18, 1984. Papers are solicited on direct and indirect methods with emphasis on actual field results and limitations. The symposium is being sponsored by the AGU Groundwater Committee and organized by Fred J. Molz, Civil Engineering Department, Auburn University, and Mary P. Anderson, Department of Geology, University of Wisconsin-Madison. A related symposium at the same meeting will focus on the theory and description of chemical transport models.

Abstracts, in AGU format, should be submitted by February 6, 1984, to Fred J. Molz, Civil Engineering Department, Auburn University, Auburn, AL 36849. Additional information can be obtained by calling Anderson at 608-262-2396 or Molz at 205-826-4326. One original and two copies of the abstract must be sent by February 22 to AGU Meetings, 2000 Florida Ave., N.W., Washington, DC 20009.

Measuring Groundwater Transport Parameters

The AGU Groundwater Committee is sponsoring a special session at the 1984 AGU Spring Meeting that will deal with modern field methods for supporting porous media chemical transport models. A model is limited by the quality of the data upon which it is based, including permeability and dispersivity parameter values and field data used for calibration. Therefore, the half-day special session will be devoted to all types of instrumentation, methodology, and field studies dealing with the measurement problem. A related symposium at the same meeting will focus on the theory and description of chemical transport models (see above).

Abstracts, in AGU format, should be submitted by February 6, 1984, to Fred J. Molz, Civil Engineering Department, Auburn University, Auburn, AL 36849 (telephone 205-826-4326) or Mary P. Anderson, Department of Geology, University of Wisconsin-Madison, Madison, WI 53706 (telephone 608-262-2396). One original and two copies of the abstract must be sent by February 22 to AGU Meetings, 2000 Florida Ave., N.W., Washington, DC 20009.

Miscible and Immiscible Transport in Groundwater

During the last 10 years, considerable work has been devoted to increasing our knowledge and understanding of transport phenomena in porous media, especially as it pertains to groundwater contamination and hazardous waste disposal. But how much have we really learned? Do we understand dispersion and other attenuation mechanisms better now than we did 10 years ago? How much confidence should be placed in predictions concerning chemical transport? What are the recent developments in characterizing multifluid flow at hazardous waste or contamination sites?

In an attempt to help answer these and other relevant questions, a special half-day session on miscible and immiscible transport of chemicals in porous media will be held at the 1984 AGU Spring Meeting in Cincinnati, May 14–18, 1984. The symposium is sponsored by the AGU Groundwater Committee. The program will focus on conceptual models of transport processes, their mathematical description, applicability of theory to field problems, and reliability of predictions. As part of the program, several invited experts will lead a panel discussion on dispersion. A related symposium, at the same meeting, will focus on field measurement of parameters affecting transport.

Abstracts, in AGU format, should be submitted by February 6, 1984, to James W. Mercer, GeoTrans, Inc., P.O. Box 2550, Reston, VA 22090 (telephone 703-435-4400) or Leonard F. Konikow, U.S. Geological Survey, 431 National Center, Reston, VA 22092 (telephone 703-860-6892). Additional information can be obtained from either of the conveners. One original and two copies must be sent by February 22 to AGU Meetings, 2000 Florida Ave., N.W., Washington, DC 20009.

Front Range Branch "Hydrology Days": Call for Papers

The AGU Front Range Branch is planning its 3 "Hydrology Days" Tuesday, April 24, through Thursday, April 26, 1984, at Colorado State University in Fort Collins, Colo. The objective is to provide a forum for hydrologists and hydrology students to meet and get acquainted and to hear each other's problems, analyses, and solutions.

This event is cosponsored by AGU's Hydrology Section and that section's Soil Water Committee. Several special sessions will be held with keynote addresses by recognized hydrologists: In particular there will be sessions on "Hydrology of the Vadose Zone" and a session on "Surface and Ground Water Models Suited for Management of Aquifers and of Stream-Aquifer Systems."

During the 3 days there will be presentations of volunteered papers, a few invited papers, and papers by students (first day only). The time allocated for presentation will depend on the response to this call for papers. Tentatively the time allotted per paper will be about 30 minutes (including discussion). Standard visual aids (regular and overhead projectors) will be provided. [illegible]

Hydrologists and hydrology students interested in presenting a paper should send a 1-page sheet (original plus one copy) with their name, affiliation, complete mailing address, telephone number, title of paper, and a brief, double-spaced typed abstract (roughly one-half page long) to:

Professor H. J. Morel-Seytoux
Past Chairman, AGU Front Range Branch
Department of Civil Engineering
Colorado State University
Fort Collins, CO 80523
telephone 303-491-5448 or 491-8549 (ask for Dr. Morel-Seytoux)

The deadline for acceptance of abstracts (or telephone calls) is February 21, 1984. Papers missing the deadline may be scheduled for presentation but may not appear on the program to be mailed out during the last week of February and advertised in *Eos* shortly thereafter. Proceedings of the conference will be published and available at the meeting. Preference on the program will be given to authors who intend to provide a written version (*Water Resources Research* journal format) of their oral presentation. Deadline for submission of written version is March 26, 1984.

There will be no registration fee for students. There will be a small registration fee (between \$20 and \$30) for others to cover room rental fees, coffee breaks, programs, copies of abstracts, and other minor expenses. Final registration details will be available when the program is advertised in early March in *Eos*. Such information will also be available on request from Morel-Seytoux as well as housing information for those who plan to stay in Fort Collins overnight.

The AGU Front Range Branch will present awards and prizes to the best student papers in two categories: M.S. and Ph.D. candidates. At the banquet the second award for outstanding contributions to hydrology will be presented. Professor Emeritus Robert E. Glover was the first recipient. Please send your nomination suggestions for this award to Morel-Seytoux at the above address.

Ice Symposium

The International Association for Hydraulic Research (IAHR) will hold the Seventh IAHR Symposium on Ice in Hamburg, Germany, August 27–31, 1984. The deadline for submitting abstracts is December 31.

Three major topics will be discussed at the symposium: basics in ice technology, ice engineering for inland waters, and arctic marine engineering. Ice technology includes instrumentation and techniques in ice engineering, statistical methods, physical modeling of ice problems, and physics and mechanics of river, lake, and sea ice. Ice engineering in inland waters encompasses the formation of river and lake ice, ice hydraulics, transportation systems, structures in rivers, and ice management in rivers. Arctic marine engineering will be discussed with regard to ice conditions, ice piling and ridging, applications of geophysical research to ice engineering, and marine transportation, offshore structures, and harbors in arctic regions.

For more information on the symposium, contact Joachim Schwarz, Ice Engineering Division, Hamburgische Schiffbau-Versuchanstalt GmbH., P.O. Box 600 929, 2000 Hamburg, FRG.

Lunar and Planetary Conference

The 15th Annual Lunar and Planetary Science Conference will be held March 12–16, 1984, at the NASA Johnson Space Center in Houston, Tex. Cosponsors for the conference are AGU, the Lunar and Planetary Institute, the Meteoritical Society, and the American Astronomical Society. Scientists working in lunar and planetary programs who wish to present papers are invited to submit abstracts no later than January 9, 1984.

There will be topical symposia and problem-oriented sessions. Some evenings will be set aside for informal special sessions, either impromptu or as designed by members of the lunar and planetary science community. Poster sessions will also be available as an alternative to oral presentations.

For more information and for indication-of-interest and abstract forms contact the 15th Lunar and Planetary Science Conference Office, Lunar and Planetary Institute, 3303 NASA Road 1, Houston, TX 77058 (telephone 713-486-2150).

Sediment Storage

Papers are invited for a special session on sediment storage in rivers and estuaries that will be held during the 1984 AGU Spring Meeting in Cincinnati, May 14–18. The session is sponsored by the AGU Hydrology Section's Erosion and Sedimentation Committee.

In recent years, there has been considerable interest in determining sediment budgets for river or estuary systems. A sediment budget includes analysis of sediment sources, of rates of delivery to the system, of transport by the system, and of sediment storage within the system. The sediment storage term in the sediment budget has been among the most difficult to quantify. The purpose of this session is to address the problems of quantification of storage in stream and estuarine environments. There has been considerable research on the topic of sediment storage in many regions of the United States and elsewhere but little communication among the various research groups. Therefore, one purpose of this session is to assess our present understanding of sediment storage and to communicate our progress by bringing these various research groups together.

The contributions will complement a small number of invited speakers who will present case studies of sediment storage in different types of river and estuarine environments and review the outstanding problems in our understanding of sediment storage. Contributions on techniques for measuring amounts of sediment storage, on techniques for dating sediment residence times in various environments, on determining sites of sediment storage, and on determining the influence of grain size on sites of sediment storage (and also on accompanying contaminants) are especially welcome. Abstracts in standard AGU format should be sent by February 15 to Karen Prestegaard, Department of Geology, Franklin and Marshall College, Box 3003, Lancaster, PA 17604 (telephone 717-291-3819). In addition, send the original and two copies of the abstract by February 22 to AGU Meetings, 2000 Florida Avenue, N.W., Washington, DC 20009.

Glacier/Ocean Interactions

At the 1983 AGU Fall Meeting, a special joint session of the Ocean Sciences and Hydrology sections on Glacier-Ocean Interactions will be held Monday morning, December 5. This is a timely subject considering the recent interest of the public and scientific community in sea level changes. The interest stems from several viewpoints:

- the influence of ice sheets and glaciers on sea level changes;
- possible disintegration of the marine glacier portions of the West Antarctic ice sheet due to a climatic warming;
- modeling of iceberg calving of present-day marine glaciers and ice sheets that has implications for ice-sheet/climate models and the disappearance of ice sheets in the Pleistocene;
- predicting iceberg production in order to protect oil platforms, minimize interference with ocean shipping, and to plan for the use of icebergs as a possible source of freshwater.

Two invited papers will address the dynamics of fast-moving marine glaciers and the factors affecting iceberg calving of a grounded marine glacier. L. Lliboutry of CNRS, Grenoble, France (the newly elected president of the IAHS International Commission on Snow and Ice), will present the first paper on fast-moving glacier dynamics. Understanding of the dynamics of fast moving glaciers is critical to the suggested disintegration of the West Antarctic ice sheet and resulting sea level change. Mark F. Meier, of the U.S. Geological Survey and current chairman of the Polar Research Board's Committee on Glaciology, will discuss calving models applied to Columbia Glacier, Alaska. This glacier is currently in transition from stability to drastic retreat and is expected to open a new fiord in the next few years; the mechanics of this process are probably similar to the uncovering of fiords around the world.

Contributed papers will cover topics such as the origins of Antarctic water masses, iceberg drift and ice shelf-ocean interactions, as well as the effect of glacier melt on global sea level, subglacial discharge to the sea, iceberg calving, and the state of equilibrium of an icestream grounding line.

Chapman Conference on Collisionless Shock Waves in the Heliosphere

February 20–24, 1984
Silverado Country Club and Resort
Napa Valley, California

Convenor: R. G. Stone

Abstract Deadline: November 22, 1983

Invited reviews and contributed papers in the following general areas: Overview of the collisionless shock, macroscopic aspects of shocks, microscopic aspects of shocks and particle acceleration. Typical subjects to be covered include:

- Why and where shocks form in the heliosphere?
- Shock dynamics and evolution.
- Shocks associated with solar activity, planetary bow shocks, corotation shocks, and shock-shock interactions.
- Subcritical, supercritical, quasi-parallel, and quasi-perpendicular shocks.
- Dissipation mechanisms.
- The foreshock.
- Particle acceleration mechanisms.

Student Travel Assistance: Deadline November 30. Student travel funds are available. To apply, write to Shock Waves Meeting, AGU, giving your educational background and your research interests.

Publication: A proposal for the publication of the invited papers as a monograph is under consideration by the AGU Monograph Board. It has also been recommended that the contributed papers be published as a separate monograph or be submitted to JGR-Space Physics through the normal AGU peer review process.

Contact: AGU Meetings, 2000 Florida Avenue, N.W., Washington, DC 20009
toll free: (800) 424-2488 D.C. area 462-6903

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Geodesy and Gravity

1910 Crustal movements
TOPOGRAPHIC AMPLIFICATION OF TECTONIC DISPLACEMENTS: IMPLICATIONS FOR GEODETIC MEASUREMENT OF STRAIN CHANGES
D. F. McTigue (Fluid Mechanics and Heat Transfer Division I, Sandia National Laboratories, Albuquerque, NM, 87185) and R. S. Stein
Correlations of level changes with topography demand an assessment of the effect of an irregular free boundary on surface deformation. This is examined through a plane strain elastic model with topography of small slope, subjected to a change in the far-field stress. To leading order, vertical surface displacements due to the topographic perturbation are proportional to the local relief. Elevation-dependent uplift results from a compressional change, and downdrop results from a tensional change. The model further predicts that the ratio of elevation change to elevation is proportional to and of the same order of magnitude as the regional strain. Horizontal strains are locally perturbed by topography as well, with the magnitude scaling with the local slope.
The predicted localization of level changes is very small in aseismic regions, and cannot contribute significantly to measured correlations. A test case in southern California bears this out, with strains of order 10^{-6} accompanied by elevation change-to-elevation ratios of order 10^{-7}. Releveling following the Nankaido-Tonankai earthquakes, which induced large coseismic and postseismic strains, reveals scattered examples of elevation-dependent level changes. However, when compared to modeled strains, the correlations are again at least an order of magnitude larger than the localization effect predicted by the elastic model.
Although the topographic perturbation of vertical displacements appears to be unmeasurably small, local variations in horizontal strain or borehole dilatation across steep relief may be discernible with current technology. (Crustal strain, topography, elasticity, geodetic leveling).
J. Geophys. Res., Earth, Paper 3B1730

Hydrology

3130 Groundwater
A SIMPLE ANALYTICAL SOLUTION FOR THE BOUSSINESQ ONE-DIMENSIONAL GROUNDWATER FLOW EQUATION.
Panagiotis K. Tolikas, Epaminondas E. Sidiropoulos, Christos D. Tzimopoulos, (Aristotle University of Thessaloniki - School of Technology - Thessaloniki-Greece).
An approximate analytical solution to the Boussinesq equation is presented here. The one-dimensional problem is reduced to an ordinary differential equation through Boltzmann's transformation, and a technique exploiting some basic characteristics of the exact solution leads to an approximate polynomial solution of the problem. The technique presented here can be applied to one-dimensional non-linear diffusion problems. (Boussinesq, seepage, non-linear differential equation, analytical solution).
Water Resour. Res., Paper 3W1652

3175 Soil moisture
NUMERICAL ANALYSIS OF SOIL WATER MOVEMENT UNDER CONDITIONS OF RAPID INTERMITTENCY OF WATER APPLICATION
N. Banerjee and K. K. Watson (School of Civil Engineering, The University of New South Wales, Kensington, N.S.W. Australia)
The significance of an intermittent system of water application to the surface of a vertical homogeneous profile of unsaturated porous material is discussed in relation to the establishment within the profile of a zone of material where uniform water content conditions prevail and flow is essentially gravitational in nature. A numerical analysis of water movement for such a system involving the simulation of up to 20 on-off cycles of water application is outlined and the approach used in modelling the hysteresis behaviour for such an exacting pattern of reversals is detailed. Results are presented for water movement in a sand for four on-off sequences namely, 2½ min - 2½ min, 5 min - 5 min, 2½ min - 5 min and 5 min - 10 min. These results support the hypothesis that the section of the profile where water movement is continuously affected by hysteresis during the intermittent water application is limited to the near-surface horizon with a lengthening zone of uniform water content material existing at greater depths. The use of this uniform water content zone in providing an in situ means of determining the hydraulic conductivity - water content relationship and in optimizing water use in sprinkler irrigation systems is discussed briefly. (Soil water movement, infiltration, redistribution, numerical analysis).
Water Resour. Res., Paper 3W1654

Meteorology

3735 Electrical phenomena
EFFECTS OF CLOUDINESS ON THE ATMOSPHERICS LEVEL DURING THE SW MONSOON SEASONS
A.B.Bhattacharya (Department of Physics, Serampore College, Hooghly, West Bengal, India), A.K.Chakraborti and R.Bhattacharya.
It is shown that the occurrence of different amount of the monsoon clouds is closely associated with the integrated field intensity of atmospherics recorded over Calcutta at 10, 20 and 30 kHz simultaneously. Some of the interesting results achieved from an analysis of the observations during the monsoons of 1977 to 1979 are reported here and the results are critically discussed in the light of the present knowledge of monsoon characteristics. (Monsoon clouds, atmospherics)
J. Geophys. Res., Atmos., Paper 3C1769

Oceanography

4720 Distributions and Water Masses (Pycnocline Development)
PYCNOCLINE DEVELOPMENT AND ITS CONSEQUENCES IN THE MIDDLE ATLANTIC BIGHT
F. Aikman III (Lamont-Doherty Geological Observatory, Palisades, N.Y. 10964)
Seasonal pycnocline development in the shelf and slope waters of the Middle Atlantic Bight is investigated numerically using a one-dimensional, two-layer, bulk-mixing model. The model considers the buoyancy budget of the system and includes both turbulent diffusion and entrainment across the pycnocline that separates the layers, as well as a parameterization for mixed layer shallowing. Climatic estimates of the surface buoyancy and energy inputs drive the model. The shelf and slope water regimes, however, experience different inputs: Freshening due to river runoff and a larger net heat gain, due to a more positive air-sea temperature difference, both contribute to a larger buoyancy input to the shelf water regime; and the wind stress is larger over the slope. Numerical computation of vernal pycnocline development results in the formation of a shelf water pycnocline that is both shallower and more intense than that over the slope. A consequence of this mismatch is a reversal of the offshore density gradient at intermediate depths and the intrusion of slope water into the shelf water pycnocline, called the pycnocline salinity maximum. It is possible that interannual variations in the timing and magnitude of the heating and fresh water input from rivers can cause concomitant variations in salt input via the pycnocline salinity maximum.
J. Geophys. Res., Oceans, Paper 3C1672

4725 Estuaries, bays, and fjords
SPRING BREAKUP AND FLUSHING OF AN ARCTIC LAGOON ESTUARY
J.B. Matthews and W.J. Stringer (Geophysical Institute, University of Alaska, Fairbanks, Alaska 99701)
Simpson Lagoon is a shallow body of water separated from the Beaufort Sea by a chain of low-lying barrier islands. Narrow channels are found between the barrier islands, one of which, the Egg Island Channel, is a major connection between the lagoon and the Beaufort Sea. The Kuparuk River produces great quantities of springtime floodwaters which overflow the still frozen lagoon. Measurements of temperature, salinity, sea level and currents have been made in Egg Island Channel during 1978 and 1979. Meltwater from the Kuparuk River was observed on satellite images to overflow the 2m-thick bottomfast ice of the lagoon in late May and early June. These floodwaters flush saline (~40‰) water out the 5 m deep channel and replace it with freshwater at 0° C. Analysis of satellite images for several years shows that overflow occurs on 31 May with a standard deviation of 8 days. Sea level rose 64 cm above mean at peak flood in 1978. Subsequently, channel waters warmed to 8° C in late June and were flushed by cold (~ 0° C) saline (~24‰) water from the Beaufort Sea in mid-July. Flooding in 1979 was anomalously early, providing additional insight into the flushing process. The return of sea water to the channel is due to wind-driven currents following the clearing of bottomfast ice in the lagoon. Satellite image analysis shows that ice-free conditions occur by 10 July with a standard deviation of 8 days. (Sea ice, surface waves, tides, and sea level, runoff and streamflow).
J. Geophys. Res., Oceans, Paper 3C1748

4765 Surface Waves, Tides, and Sea Level
TIDAL FORCING OF THE WATER MASS INTERFACE IN THE STRAIT OF MESSINA
T.S. Hopkins (Oceanographic Sciences Division, Brookhaven National Laboratory, Upton, NY 11973), E. Salusti, D. Settimi
The tidal currents of the Strait of Messina and their effect on the displacement of the water-mass interface are discussed utilizing the historical velocity data of Francesco Vercelli, taken from ~100 anchor stations during 1922 and 1923. The data show a complex, strongly tidal behavior, in which speeds of 200-300 cm/s are attained over the sill. Messina is an amphidromic point for the tides of the two main basins of the Mediterranean Sea, and two distinct water masses flow through the strait at different stages of the tide: the subsurface Levantine intermediate water flowing north alternating with surface Tyrrhenian water flowing south. The time evolution of the interface between the two marine water layers at the semidiurnal periodicity is computed from the observed distribution of acceleration terms for the baroclinic component. This interface shows large vertical oscillations with amplitudes of ~400 m intersecting both the surface and bottom. The results are in reasonable agreement with recent satellite data and other recent field observations and numerical experiments. An estimate of the mean position of the interface is made by assuming that the potential energy required to uplift the interface, from the equilibrium depth of 150 m to the observed 30 m depth over the sill, is derived from the time-independent contribution of the nonlinear field acceleration term. The results are in reasonable agreement with observations.
J. Geophys. Res., Oceans, Paper 3C1326